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JOURNAL  
OF THE  
NORTH-CHINA BRANCH  
OF THE  
ROYAL ASIATIC SOCIETY.

NEW SERIES, No. XIII.

SHANGHAI:  
PRINTED AT THE "CELESTIAL EMPIRE" OFFICE.  
1879.



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NORTH-CHINA BRANCH

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# CONTENTS.

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	PAGES.
Report of the Council for the year 1878 .....	i
List of Members .....	iii
Treasurer's Report .....	vi
Librarian's Report .....	x
Report of the Curator of the Shanghai Museum for the year 1878.....	xiii
President's Address.....	xix
ARTICLE I.—Alligators in China, by A. A. FAUVEL.....	1
ARTICLE II.—Periodical Change of Terrestrial Magnetism, by F. W. SCHULZE .....	87
ARTICLE III.—The Family Law of the Chinese and its Comparative Relations with that of other Nations, by P. G. von MÖLLENDORFF.....	99
ARTICLE IV.—The Story of the Emperor Shun, by T. W. KINGSMILL .....	123

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REPORT  
OF THE  
COUNCIL OF THE NORTH-CHINA BRANCH  
OF THE  
**Royal Asiatic Society,**  
FOR THE YEAR 1878.

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At the Annual Meeting held in January the following gentlemen have been elected Office Bearers for the year 1878, viz :—

T. W. KINGSMILL, Esq.,	<i>President.</i>
F. B. FORBES, Esq.	} <i>Vice-Presidents.</i>
E. C. TAINTOR, Esq.,	
JOSEPH HAAS, Esq.,	<i>Secretary and Treasurer.</i>
P. G. VON MÖLLENDORFF, Esq.,	<i>Librarian.</i>
A. FAUVEL, Esq.,	<i>Curator.</i>
C. T. GARDNER, Esq.,	} <i>Councillors.</i>
F. B. JOHNSON, Esq.,	
A. KRAUS, Esq.,	
D. J. MACGOWAN, Esq., M.D.,	
J. E. REDING, Esq.,	
T. G. SMITH, Esq.,	

During the year five Meetings have been held, when the following Papers were read :—

- 1.—“The Political and Commercial Intercourse of China with Central Asia, during the second Century, B. C.,”—by T. W. Kingsmill, Esq.

- 2.—“The Climatology of Eastern Asia,”—by Dr. H. Fritsche.
- 3.—“The Toming, an enthralled class of Chekiang,”—by D. J. Macgowan, Esq., M.D.
- 4.—“Droughts in China, A. D. 620-1643,”—by Alex. Hosie, Esq., M.A.
- 5.—“On the Stone Figures at Chinese Tombs and the Offering of Living Sacrifices,”—by W. F. Mayers, Esq.
- 6.—“The Ancient Language and Cult of the Chows, being Notes, Critical and Exegetical, on the Shih-king, or Classic of Poetry of the Chinese,”—by T. W. Kingsmill, Esq.
- 7.—“The Comparative Study of Chinese Dialects,”—by E. H. Parker, Esq.
- 8.—“Sun-spots and Sun-shadows observed in China, B. C. 28—A. D. 1817,”—by Alex. Hosie, Esq., M. A.
- 9.—“The Fixing of some of the most Prominent Localities of Shanghai by Triangulation,”—by Lieut. G. Kreitner.
- 10.—“Periodical Change of Terrestrial Magnetism,”—by F. W. Schulze, Esq.
- 11.—“Supplementary Notes on the Periodicity of Famines in China and their connexion with Sun-spots,”—by Alex. Hosie, Esq., M.A.
- 12.—“Rock Inscription at the Northside of Yentai Hill,”—by J. Rhein, Esq.
- 13.—“The Family Law of the Chinese and its Comparative Relations with that of other nations,”—by Herrn P. G. von Möllendorff.
- 14.—“The Origin of Greek Names for China and the Chinese,”—by T. W. Kingsmill, Esq.
- 15.—“On the Alligators of China,”—by A. Fauvel, Esq.

In the course of the year twenty-five new members have been elected, while ten gentlemen resigned their membership. There is also to be recorded the sad loss by death of three valuable members in the persons of Messrs. E. C. Taintor, W. F. Mayers and F. E. Heyden, the two former having for a number of years been some of our most prominent and accomplished contributors.

Owing to difficulties which to overcome were beyond the control of the Editorial Committee, the publication of the Society's Journal has been unfortunately very much retarded, however its publication will very shortly appear.

A List of the Members is herewith appended.

Subjoined are the Treasurer's, the Librarian's and the Curator's Reports.

# LIST OF MEMBERS.

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## HONORARY.

---

Sir Rutherford Alcock, K.C.B.	A. F. Marques Pereira.
Sir Brooke Robertson, C.B.	Sir Harry S. Parkes, K.C.B.
Vice-Admiral Sir Charles Shadwell, K.C.B.	Rev. S. Wells Williams, LL.D.
Sir T. F. Wade, K.C.B.	Geo. F. Seward, Esq.
Sir W. H. Medhurst, K.C.B.	Alex. Wylie, Esq.
Rev. J. Legge, D.D., LL.D.	Col. H. Yule.

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## CORRESPONDING.

---

Rev. J. Edkins, D.D.	Rudolph Lindau.
W. Lockhart, F.R.C.S.E.	Dr. Bastian.
D. J. Macgowan, M.D.	F. H. Hance, PH.D.
Monseigneur de la Place.	Rev. S.I.J. Schereschewsky, D.D.
Rev. W. Muirhead.	J. C. Hepburn, M.D.
Rev. A. Williamson, LL.D.	Rev. S. R. Brown, D.D.
Rev. Griffith John.	D. B. McCartee, A.M., M.D.
Rev. C. E. Moule.	Lieut. F. da Silveira.
Rev. Canon McClatchie, M.A.	Lieut. Col. Gordon.
Rev. Josiah Cox.	John Fryer.
Rev. W.A.P. Martin, D.D., LL.D.	Dr. Ito Keischke.
Rev. A. P. Harper, D.D.	

## RESIDENT.

---

E. L. B. Allen.	A. A. Krauss.
H. Bailey.	C. Kreyer, PH.D.
J. de Bielke.	A. J. Little.
J. D. Bishop.	L. S. Little, M.D.
Chevalier C. de Boleslawski.	E. G. Low.
J. McLeavy Brown.	G. G. Lowder.
J. Bryner.	C. Lueder-Redewisch.
Very Rev. Dean Butcher, D.D.	H. Maignan.
B. Christierson, M.A.	P. G. von Möllendorff.
J. M. Cory.	Herbert S. Morris.
J. D. Crawford.	Peter Orme.
A. Davenport.	Rev. E. R. Palmer.
A. Fauvel.	J. E. Reding.
H. J. Fisher.	Charles Rivington.
F. B. Forbes.	E. Ruegg, PH.D.
P. E. Galle, M.D.	J. Sampson.
P. V. Grant.	E. A. Sassoon.
R. A. Gubbay.	W. Saunders.
J. Haas.	C. Schmidt.
G. W. Haden.	Alexander Sim.
E. P. Hague.	T. G. Smith.
F. Hirth, PH.D.	A. B. Stripling.
A. J. How.	H. Sutherland.
P. G. Hübbe.	D. B. Tata.
R. A. Jamieson, M.D.	Rev. J. Thomas.
D. C. Jansen.	Gerald E. Wellesley.
J. Johnston, M.D.	W. S. Wetmore.
F. B. Johnson.	A. G. Wood.
T. W. Kingsmill.	F. Youd.
A. Kraus.	

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## NON-RESIDENT.

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R. G. Alford—Hongkong.	C. D. Braysher—Newchwang
Herbert Allen—Wuhu.	Byron Brenan—Peking.
W. S. Ayrton—Hankow.	H. B. Bristow—Chinkiang.
E. C. Baber—Chunking.	H. O. Brown—Berlin.
J. J. F. Bandinell—N'chwang.	S. W. Bushell, M.D.—Peking.

— . Coignet—Japan	W. Lancaster.
W. M. Cooper—Ningpo.	W. P. Mangum—Nagasaki.
August C. Cordes—Tientsin.	H. P. McClatchie—Hankow.
H. L. Dennys—Hongkong.	Rev. G. D. B. Miller.
J. Dodd—Amoy.	O. von Möllendorff, PH.D.—
Rev. E. J. Eitel, PH.D.—H'kong.	Tientsin.
E. Farago—Chefoo.	J. Mongan—Tientsin.
His Ex. J. H. Ferguson—Chefoo.	Rev. G. S. Owen—Peking.
T. T. Fergusson—Chefoo.	E. H. Parker—Chinkiang.
Alex. Frater—Takao.	L. Pichon, M.D.—France.
H. Fritsche, PH.D.—Peking.	Colin de Plancy—Peking.
C. Gardner—Chefoo.	David Reid.
P. Giquel—Paris.	J. Rhein—Chefoo
G. B. Glover—U. S.	E. Rocher—Amoy.
W. Gottburg, M.D.—Hamburg.	Hon. James Russell—H'kong.
Rev. W. S. Hall.	Hon. Phineas Ryrie—H'kong.
J. L. Hammond—U. S.	T. Sampson—Canton.
T. Hanbury—England.	Lieut. C. A. Schultz—H'kong.
R. Hart—Peking.	His Ex. C. A. Skatschkoff—
Ed. Henderson, M.D.—England.	St. Petersburg.
James Henderson—Tientsin.	Hon. Cecil C. Smith—S'pore.
A. E. Hippesley—England.	Reginald D. Starkey.
H. Hobson—Wenchow.	G. C. Stent—England.
Alex. Hosie, M.A.—Canton.	O. C. Stuhlmann—Hoihow.
J. Jamieson—Chefoo.	S. A. Viguier—Newchwang.
F. Kleinwächter—Amoy.	T. Watters—Ichang.
F. P. Knight—Newchwang.	F. W. White—Hankow.
H. Kopsch—Chinkiang.	H. Wicking—Hongkong.
W. Krey—Ichang.	R. Chatterton Wilcox—H'kong.





## TREASURER'S REPORT.

*To the Committee of the*

NORTH-CHINA BRANCH OF THE ROYAL ASIATIC SOCIETY,  
Shanghai.

GENTLEMEN,

In laying the Accounts of the North-China Branch of the Royal Asiatic Society before you, I regret to say that the same show a deficit of \$107.64.

This however is not so discouraging as one might be inclined to think, looking at it superficially.

It is true that in comparison with last year's there is a great falling out in the proceeds from the sale of the Society's Journal, but this deficiency is to be accounted for, firstly by not having up to this date received the accounts of the booksellers for the last quarter, the proceeds of which will therefore appear in the new year's account; secondly the retard in the publication of last year's Journal, by which the sale was restricted to the former Journals, and thirdly our very liberal free contribution of the same.

On the other hand I am extremely glad to announce that the subscriptions collected in 1878 represent the goodly sum of \$859.50, the highest figure ever reached in this item. Taking in consideration the movements of the resident members, the shifting about of the non-resident ones, this amount is highly creditable to our Society, as it shows the interest China residents take in the welfare and progress of our Society. This is our chief income upon which our Society depends, with which we defray the numerous expenses, and which helps us to carry on the scheme the Society ever had in view, namely propagation of science in China, and supply means to study the country and people, among whom we live and of whom still so little is known.

Among the expenditures you will find the item of \$128.43, the balance of a loan which we borrowed from the funds of the Shanghai Museum, with this item our old debt to the Museum is extinguished, and in the next year's account it will no more appear.

The "house expenses" show the usual annual average, as it is impossible with all economy to reduce them any more; the same remark applies to the "advertisements," and to the item of "expenses for transmitting journals."

Item "rent to the Shanghai Library" really belongs to the account of the Shanghai Museum, but should this expense be thrown upon that institution it would jeopardize its existence, as it has no means to defray it; this sum of Tls. 150 might therefore be looked upon rather as a grant given by our Society to the Museum.

The advance made to the "Celestial Empire" amounting to \$126.76 really belongs to our 1879 expenditure, as it was for the printing of our next Journal. The same remark applies to the next item "tracing and carving maps for Journal of 1878," amounting to \$114.00, of which we hope that a part of it will be refunded to us by the author of the "Climatology of Eastern Asia."

The expenses for the small exhibition we had on our premises together with the two "Conversazioni" in connection therewith amount to \$24.90, a very trifling amount taking into consideration the pleasure it afforded the community in general, and the success the undertaking itself has enjoyed.

The income of the Shanghai Museum does not by much fall short to that of last year's. Next year the deficiency may be greater as there will be no refundment of monies from the Asiatic Society to be expected any more, the latter having paid up what was due to the Museum. While the income of the Museum for 1879 will thus be considerably curtailed, the expenditures on the other hand will be less inasmuch as the expense incurred for show cases, etc. will fall out. An extra expense will, however, have to be considered in order to increase the amount of fire insurance, the present sum Tls. 1,000 being inadequate to the value of the Museum's property say about Tls. 2,000.

The Shanghai Museum having gradually grown into popularity as an interesting and useful institution we may fairly count upon the continuance of the grant of Tls. 250 from the Municipality without which its existence would be doubtful.

JOSEPH HAAS,  
*Hon. Treasurer.*

**BALANCE SHEET OF THE**  
**North-China Branch of the Royal Asiatic Society,**  
**FOR THE YEAR 1878.**

4111

1878	1878	\$	c.		\$	c.
Sep.	Jan.			1		
Dec. 31	Dec. 31	41	80	Paid balance due to Treasurer from 1877 .....	190	42
		859	50	" balance of loan due to Shanghai Museum, Tls. 98.48 .....	128	48
		107	64	" house expenses, viz:—		
				taxes, insurance, gas,		
				coolie, wages, etc.....	112	89
				" expenses for Library, as		
				bookbinder, etc. ....	6	90
				" advertisements.....	79	72
				" expenses for transmitting		
				Journals .....	18	87
				" rent to Shanghai Library,		
				Tls. 150 .....	206	05
				" "Celestial Empire," ad-		
				vance for printing Jour-		
				nal of 1878 .....	126	76
				" tracing and carving maps		
				for Journal of 1878 .....	114	00
				" extraordinary expenses,		
				viz: Conversazione,		
				shroff, etc.....	29	90
				Total...	\$1,008	94

E. & O. E.

# BALANCE SHEET OF THE

## Museum Fund of the N.-C. Branch of the Royal Asiatic Society,

FOR THE YEAR 1878.

1878		Tls.	c.	1878		Tls.	c.
Jan.	1 To balance of 1877 .....	87	95	Jan. 31	Paid carpenter for cases .....	102	82
Mar.	8 „ balance of loan to N.-C. B. of the R. A. Society .....	98	48	Mar. 28	Recreation Fund, interest on loan, Tls. 1,500 .....	75	00
„	20 „ sale of birds.....	1	92	Apr. 13	fire insurance .....	8	00
Apr.	8 „ grant of Municipal Council	250	00	Dec. 31	taxidermist's wages and utensils for Museum.....	208	01
				„ 31	Balance in hand of Treasurer...	40	02
	Total...	Tls. 488	35		Total...	Tls. 488	35

E. & O. E.

Shanghai, 31st December, 1878.

JOSEPH HAAS, Hon. Treasurer.

## LIBRARIAN'S REPORT.

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As stated in the various reports of my predecessors the Society has not been able to acquire by purchase any books, all the additions to the Library have been donations by authors and exchanges with other learned Societies.

Appended is a List of Works presented to the Library during the year 1878.

P. G. VON MÖLLENDORFF,  
*Hon. Librarian N.-C. B. R. A. S.*

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### LIST OF WORKS PRESENTED TO THE LIBRARY OF THE NORTH-CHINA BRANCH OF THE ROYAL ASIATIC SOCIETY DURING THE YEAR 1878.

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1. Reports on Trade for 1876 and 1877.
2. Returns of Trade for 1876 and 1877, Part I.
3. The same in Chinese.
4. Medical Reports, 15th issue, 1878.
5. W. F. Mayers, *The Chinese Government. A Manual of Chinese Titles, categorically arranged and explained, with an appendix.* Shanghai, 1878, 8vo.
6. *Annual Report of the Board of Regents of the Smithsonian Institution.* Washington, 1876, 8vo.
7. *Smithsonian Report*, 1875, 1876.
8. *Smithsonian Contributions to Knowledge*, Vol. XX and XXI. Washington, 1875, 1876, 4to.
9. *Bulletin of the Essex Institute*, Vol. VIII, Nos. 1-12, 1876, 8vo.
10. *Annual Report of the Trustees of the Museum of Comparative Zo-ology at Harvard College in Cambridge.* Boston, 1876, 8vo.
11. F. Scherzer, *Journal d'une Mission en Corée par Koeiling, Ambassadeur de S. M. l'Empereur de la Chine près la Cour de Corée en 1866.* Paris, 1877, 8vo.
12. R. K. Douglas, *The Life of Jenghiz Khan. Translated from the Chinese. With an Introduction.* London, 1877, 8vo.



13. Oestereichische Monatsschrift für den Orient. No. 12, Dec. 1877. Nos. 1-10, 1878.
14. Bulletin de la Société de Géographie. Oct., Nov., Dec., 1877. Jan., April, May, June, July, Paris, 1878.
15. Monatsbericht der Kgl. preuss. Akademie der Wissenschaften zu Berlin. Jan., Febr., März, April, May, June, July and Aug. 1878.
16. Department of Agriculture. Washington, 1877.
17. Naturhistorische Hefte, herausg. vom ungarischen National Museum. Budapest, 1877, Vol. I.
18. L. von Lóczy, Die Liskovaer Höhle im Baráthegey. Budapest, 1878, 8vo.
19. Atti della R. Akademia dei Lincei. Transunti, Vol. II, fasc. 1-6. Roma, 1878, 4to.
20. Repertorio Sinico-Giapponese, fasc. III. Firenze, 1877.
21. Mittheilungen des Vereins für Erdkunde zu Halle a. S. 1877.
22. Proceedings of the Ninth Annual Session of the Am. Philological Association. Hartford, 1877.
23. Proceedings, Am. Oriental Society, 1877, 1878.
24. Proceedings of the R. Society of Edinburgh, Vol. VI-X.
25. Boletín Astronómico de Mexico, 1878.
26. Legrand, La Nouvelle Société Indo-Chinoise. Paris, 1878.
27. The Entomologists Monthly Magazine. London, 1878, June.
28. A. M. Tudom. Akademia Évkönyvei, 1875.
29. C. B. H. von Rosenberg, Reis tochten naar de Geelvinkbaai op Nieun-Guinea in de Jaren, 1869 en 1870. 'S. Gravenhage, 1875, 4to.
30. A. Agassiz, North American Starfishes. Cambridge, 1877, 4to.
31. Trübner's Am. and Oriental Literary Record, No. 129-301, 131-32, 133, 134. 1878.
32. Transactions of the Asiatic Society of Japan, Vol. VI, Part I, II (3 copies), 1878.
33. Second Report of the Chinese Polytechnic Institution. Shanghai, 1878, 8vo.
34. Bijdragen tot de Taal-Land-en Volkenkunde van Nederlandsch-Indië. Derde Volgers: X, 1, 2, 3; XI, 1, 2. Vierde Volgers: I, 1; Verslag, 1851-1876.
35. Proceedings of the Royal Society. Vol. XXV, No. 175-178; Vol. XXVI, No. 179-183. 1878.
36. Journal of the Statistical Society of London, Vol. X, Part I (1847); XII, 1 (1849); XVI, 3, 4 (1853); XL, 1-4 (1877); XLI, 1 (1878.)

37. Proceedings of the R. Geographical Society, Vol. X, 1 (1865); XII, 1 (1868); XVI, 4 (1872); XXI, 2-6 (1877); XXII, 1-3 (1878.)
38. The Journal of the R. Geographical Society, Vol. XLVI, 1876; XLVII, 1877.
39. Mittheilungen der Geographischen Gesellschaft in Wien, 1877.
40. Journal of the Straits Branch of the R. As. Society, Vol. I, 1878.
41. Revd. J. B. Hartwell, The Foochow Essays. Shanghai, 1877, 8vo.
42. C. Alabaster, The Doctrine of the Chi.
43. ———, The Triune Powers, Amoy.
44. Sitzungsberichte der mat-phys. Classe der K. b. Akademie der Wissenschaften zu München. Heft, 2, 3 (1876); 1, 2 (1877.)
45. Gümbel, die Geognostische Durchforschung Bayerns. Rede, 1877, 4to.
46. Sitzungsberichte der philos.-philol. und hist. Classe. München, 1876: 4, 5; 1877: 1, 2.
47. Carl von Prantl, Verstehen und Beurtheilen. Festgabe, 1877, 4to.
48. Döllinger, Aventin und seine Zeit. Rede, 187, 47to.



## Shanghai Museum.

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### REPORT OF THE CURATOR FOR THE YEAR 1878.

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The Curatorship of the Shanghai Museum of Natural History having been in my hands since November 1877, that is above a year, I now beg to hand to the Council of the North-China Branch of the Royal Asiatic Society my report hereon and also take advantage of this opportunity to make some suggestions towards the improvement and enlargement of the said Museum.

Since November 1877, one hundred and thirty-seven birds have been presented to the Museum; the greater number from Shanghai and its neighbourhood, some from Ningpo and Chinkiang, and a few from Chefoo. Amongst them we met with only fourteen new to the collection. They were:—

Some couples of the Mongolian grouse (*Syrrhaptes paradoxus*), bought in the Shanghai Market, known as Smith's Market.

A few specimens of the Japanese Ibis (*Ibis Nippon*) sent from Ningpo by Mr. J. A. Meyer.

A female Temminck Tragopan (*Cerionis Temminckii*), sent by Mr. J. M. Young; also a female Darwin's Puckras Pheasant (*Phasianus Darwinii*), presented by Mr. W. M. Cooper, H.B.M.'s Consul at Ningpo.

Two specimens of the Albatross (*Diomedea Derogata*) were received; an adult one from the Chusan Islands, sent by Captain Croad, and a young one in its brown plumage sent from Chefoo by Mr. Donnelly. Unhappily as often happens with birds sent from distant ports, this last specimen arrived in too bad order to be mounted.

From Mr. Ballard, of the Kiangnan Arsenal, we received the only specimen of Tantale (*Tantalus leucocephalus*) we possess.

A *Chelidon lagopoda*, taken at sea by Mr. Knot, was also added to the collection.

I myself brought from Chefoo a pair of storks (*Ciconia Nigra*), of which one in young plumage has been placed in the Museum as the only representative of the species. The other one is



still alive and will be sacrificed to science when in full adult plumage.

A parrot is also new to the collection, but its origin is doubtful. To Dr. Burge we owe a beautiful specimen of the Great-Belted Kingfisher. A very rare bird of the same species was sent to the Museum by Mr. G. W. Hayden, Lightkeeper on the Island of Sha-Wei-Shan. Unhappily it was not in a condition to be mounted, and we had to preserve the skin simply by drying it.

With one or two more birds which I have not been able to name yet, I close the list of the additions to the ornithological collection.

This makes up the total of the birds to about four hundred, but as the Chinese birds described or named in Abbé David's beautiful work "*Les oiseaux de la Chine*" are eight hundred and thirteen in number, it is evident that we are far from having completed the collection. However with a few exceptions, most of the northern birds are in Museum; but owing to the difficulty of sending animals in the flesh from distant ports, or of finding men able to skin them properly there, we are poor in southern birds, and it would be a great boon to the Museum if a good correspondent and collector could be found in Hong-kong, Canton, or Manila, perhaps even Singapore, as many of the birds of these southern shores migrate in summer as far north as Shantung.

The Museum's collection of Mammals and Reptiles has also been enlarged. Among the most valuable of these additions we must mention a large Fur Seal from the Japanese northern seas. A female of the *Hydropotes inermis* has been bought in the Shanghai market; we still want a good old male with tusks. A grey-breasted squirrel (*Sciurus griseipectus*) was offered by Mr. Krauss and two Angier's Deers were given by Mr. F. B. Forbes.

In September the carcass of a Russian Bear was sent from The Farm, some parts of it being already in a state of decomposition. Our native taxidermist Mr. Clement Wang took great pains in preparing it under my directions; but we failed entirely owing to the heat. Had we possessed a proper dissection room we might have succeeded better.

The two lower jaw bones of a Japanese Whale were recovered from an adjoining timber yard, where they had been placed with some lime to dissolve the fatty tissue attached to them.

But of all the most important addition to the Museum is the still little known Chinese Alligator, of which two specimens have been received. The first, an adult male, was dug up from its

burrow in the neighbourhood of Wuhu, and was presented alive to the Museum by Mr. J. L. E. Palm. It was dissected and mounted, and adorns our collection. The second specimen, a female, was received from Chinkiang in October, and kept alive till December 24th, when it died. The carcase was placed in spirits of wine and sent in January 1879, to Mr. A. Milne Edwards, the learned Curator of the Paris Museum, to be studied and named, as it appears to be a new species.

The number of Insects, Molluscs, and Snakes has been increased by only a few specimens. One Butterfly new to the Museum was found by me in the Shanghai Public Garden.

Of fishes we received two or three only, and I could have made a very decent collection had we proper accommodation and more room. We have only wretched glass tubes made here, which always leak in summer, and still more wretched looking jars or bottles of every form and shape, of all shades and colours, descript and nondescript; old jam pots, preserve bottles, medicine vials, with the names of Crosse and Blackwell or others cast on them. This is really a part of the Museum I am ashamed of; but the sinews of war, which are also those of science and progress, are missing. "*Pas d'argent, pas de suisses*" say the French; no money, no collections, echoes the Curator of the Museum. Under such difficulties it is indeed impossible to make any serious attempt to form a collection of Chinese fishes.

This collection I consider a most important one, as this branch of our Chinese Natural History is still little known; there is no good work yet published on Chinese fishes. Consequently, I would strongly recommend the Society to spend a certain sum of money in buying proper glass jars at home, then decent looking *étagères* could be built for their reception, and the Shanghai market would furnish us at once with a goodly number of curious fishes.

I do not know how many pet dogs and birds have been stuffed for their afflicted owners. A good many boar-heads, foxes, and birds, have also been mounted as trophies for the proud Nimrods who have distinguished themselves on the hunting grounds of the Celestial Empire. But no list is kept of these, and the charge of half a dollar or more for such work made is, by a rule which I found established, the benefit of our taxidermist.

A few skins of birds kept as duplicates were also sold to private collectors for the benefit of the Museum. Unhappily we have no room, no accommodation, to keep a stock of these

commodities, and this is another of the desiderata or improvements suggested.

Three new glass cases have been added during the year to contain the new objects, but when I ask for more I am reminded that the Museum has been put in debt by this extravagant expense, and that there is no more money forthcoming.

In the way of an herbarium we have nothing, and really it is useless attempting to create one before we have room to place it, as the Museum is already quite full.

I should recommend that some skeletons of the typical Chinese Mammals, Deer, Tiger, etc., be procured and mounted, but alas, where are we to put them?

An important improvement was tried last year in endeavouring to start a Mineralogical collection, and our President, Mr. T. W. Kingsmill, gave for this purpose his valuable collection of minerals and fossils, which can form a good nucleus for the practical illustration of Chinese geology, another branch of our Natural History which is little known. I am sorry to say that one third of this collection is still unprovided with a show case, for the reason I have already stated.

It is great pity, for Chinese fossils are not known at all. I have endeavoured to increase this mineralogical collection, and have already received through Captain Anderson of the Chinese Revenue Cruiser "Kua-shing" samples of the different rocks of the Islands in the neighbourhood of Shanghai and Ningpo. I intend moreover to write to the engineers in charge of the coal mines now in process of opening in Chihli, Formosa, and Anhuei, in order to invite them to send to the Museum samples of the different strata traversed by the borings and some of the most important fossils. My colleague, Mr. Keymeulen, Assistant-in-charge of the Customs at Keelung, has already promised to interest himself in this matter.

But then we must renew our demand for space. We have really none left in the only room now constituting the whole of the Museum, and supposing that funds are subscribed for the keeping of the institution, they will be of little use as long as the increase of the collections is checked by this want of space.

We must also mention that a valuable collection of books on Natural History was added to the Museum Library. It consists of works belonging to the late Curator, Mr. J. P. Martin, and which, thanks to the liberality of his friends and of some lovers of natural science, were purchased from Mrs. Martin for the sum of 500 Dollars. They are now placed in the cupboards under the show cases for want of a more available and convenient



place. A list of these books is here appended. This is the place to mention that we do not possess yet the most important of all books for the Museum, that is the excellent book on the Birds in China published last year by M. l'Abbé Armand David. In order to be able to classify our collection, I have been obliged to buy a copy at my own expense, as I knew well that our exchequer could not bear the expenditure of six pounds sterling which it necessitates. If money is once more forthcoming, I strongly advise the Council to procure that book, as well as that of Siebold on the Birds of Japan. I am told that another book on the Birds of China is now in preparation in England from the notes and publications of the late Mr. Swinhoe. I dare say it would be also a necessary adjunct to our collection. Sending skins home for identification is a very good thing, but it often occurs that they never come back any more, or at least that the best ones are kept in order, it is said, to recognise the services of such and such Museum towards the North China Branch of the Royal Asiatic Society. I have some experience of this kind of friendship between scientific bodies, and I strongly advise the Council not to allow any rare skins or specimens to leave the Museum, unless it is altogether intended as a gift, for which no returns is expected, except perhaps in books or publications. Some exchanges may be made, but unless they come from Eastern shores of Asia I do not care very much for them. Indeed, our Museum is already far too small to receive the whole of the objects necessary to illustrate the Natural History of China. Why should we attempt generalization? Except in the very largest cities as London, Paris, New York, etc., it is absurd to attempt to collect everything, and scientific people at home are more and more advising the formation of local museums, as the only means of discovery and progress, the generalities of science being pretty well known in our enlightened century. Such I think must be the aim of our Museum curators. Let us illustrate China, and perhaps Japan as it is closely allied in everything, as well and completely as possible; let us collect for our library all the new works on Chinese and Japanese Natural History, publish our new discoveries, and then the Shanghai Museum will be of good use, not only to our increasing community but also to the scientific world at large.

I think there is yet another way in which the Museum could be made useful to the public. From the occasional demands I have received now and then from merchants, for information about various Chinese produce, as hemp, jute, China grass, silk,

it would be perhaps very useful to make in the Museum a collection of the raw products of the Empire.

This would be a kind of commercial collection, which could be accompanied by small models of Chinese machines, etc. If not of great use to merchants it would certainly help them sometimes and aid to the practical education of children destined for trade. It would be easy to procure those samples.

But before thinking of days of glory and use for our Museum, we must turn our eyes to stern reality and make first the necessary repairs to its roof, which leaks badly, endangering the safe custody of the existing collection.

As you will gather from this report, the wants of the Museum are threefold, 1st, repairs ; 2nd, more space, and 3rd funds. I should perhaps place first this 3rd consideration, as it is evident enough that we cannot go on repairing without money.

The Municipal Council last year kindly granted us a sum of 250 Tls. for which we can show good use. We must now turn beggars again and implore more assistance, without which we must perish. Now I do hope for the sake of science that the enlightened population of the Model Settlement, always, so ready for progress that it is even mooted by a company of intelligent men to introduce here the electric light, will not allow the useful institution of the Museum to fall to the ground. Museums are indeed becoming daily of more importance in the practical and scientific education of men.

We already possess good schools in Shanghai ; some more are contemplated, or even in progress, for the education of both Foreign and Chinese children, and I am sure I cannot be mistaken in saying that the Museum, enlarged as I propose, will be a practical and necessary adjunct to these schools. I am glad to say it has been already understood in this way by the best of our existing schools. The Jesuit Fathers have indeed sent their pupils to visit our collection, and you all know that their Museum in Siccawei, for which they have lately received a skilful taxidermist from Paris, was established for this purpose.

In conclusion, the most important of all things now for the Museum is the sinews of war which are also the sinews of science and progress, that is money. I hope you will excuse me for always asking for it, but if Cato's of old often repeated "*Delenda est Carthago*" ended in success for Rome, I dare say to you, without comparing myself to the old severe censor, and with hopes of glory for Shanghai, go to Mecènes, that is the Municipal Council : "*Petite et Accipietis.*"

**Address to the Members**  
OF THE  
N.-C. BRANCH OF THE ROYAL ASIATIC SOCIETY,  
DELIVERED AT SHANGHAI, 3RD FEBRUARY, 1879,  
BY THOS. W. KINGSMILL,  
*President.*

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IN closing the second year during which it has been my privilege to act as your President, it is but right that I should pass in review the more salient points of those investigations in which our society is more especially interested; in the hope that more attention may be paid to many of the important topics on which information may be gained in China.

Although in many respects we are here at a disadvantage compared with those working in Europe, and although we have no official support of any kind to scientific research, and but few means of making ourselves acquainted with the rapid march of science elsewhere; there are conditions which render our position in some cases an advantageous one.

We have ready access to the stores of Chinese records handed down from an antiquity at least respectable, and we enjoy means of making ourselves acquainted with a literature but little studied or comprehended in Europe.

If we ask have we made the best use of those opportunities, I fear that the answer must be in the negative, and that with but few exceptions we have been content to follow rather than to lead, and that most of the sound and useful work already executed has been performed by students at a distance from China.

It is thus that the years immediately past have been marked by few extensions of our knowledge of China, and both our literary and political relations have remained almost in *statu quo*. Few new investigations have been commenced, nor has the period been productive in bringing to an issue former controversies. In the physical sciences our gains have been few, and

the passion for geographical exploration which has so much extended our knowledge of other regions has left China comparatively neglected. Our maps of China are still remarkable for what they omit rather than for what they contain, and its geology and mineralogy remain almost untouched.

In what has been done, however, our Society has continued to hold a high place, and has afforded a stand point where men of differing views have been able to meet on common ground without their differences lending to polemical disputes, and it therefore remains for the members to advance in the future the objects for which we have been formed by themselves moving forward in original researches, or by aiding and abetting by their influence and position those who are willing to assist in the work.

This is the more necessary that our Society has had during the past two years to regret the loss by death or departure from China of many of its most distinguished members. In its recent issues the names of the contributors will, for the most part, be found to be new, and this alone, while it holds out a prospect of future usefulness, should lead us to emulate the zeal and learning of those who have gone before.

Among those who have passed away the name of Charles Wickliffe Goodwin, who has in former times occupied the chair to which you have done me the honour to call me, will long be remembered. Although his early predilections led him to become a master of Egyptian antiquities, his was a mind which could not fail to take an interest in all that concerned philology and ethnology, and to his advice and assistance always willingly given I have myself been frequently indebted. The death of William Frederick Mayers who had risen to the first rank as a student of China and the Chinese, and who has often enriched our pages out of his wonderful stores of Chinese lore has also been a severe loss to our small Society. The volume of our transactions just published contains in an interesting account of Chinese Burial Rites one of the latest of his many investigations. Robert Swinhoe, F. R. G. S., F. Z. S., many of whose valuable and original contributions to our knowledge of the natural history of China are to be found in our Transactions from time to time, has also passed away. Mr. J. Patrick Martin to whose exertions we owe much of the success of our natural history museum is not the least regretted in our list of deceased members.

Besides these losses by death we have to regret the severance from us from other causes of many of our oldest and most active members. Dr. S. Wells Williams, our honorary member,



well and favourable known during his residence in China to many who but for him would have known but little of its history and productions, now enjoys at Yale College the distinguished position of Professor of Chinese. Mr. George F. Seward for some years our President, has been removed by his government from Shanghai to the more dignified position of United States Minister at Peking. Sir Walter Medhurst, also for many years an occupant of this chair, has retired to spend in private life a well-earned and learned leisure.

Perhaps, however, the Society has most to regret the loss of the personal services of our late Vice-President Mr. Alexander Wylie, whose unobtrusive services will long be remembered by those who had the privilege of acting with him. Profound in his knowledge of Chinese his learning was always at the command of the conscientious enquirer, and to his advice and assistance, at all times willingly rendered, many members of our Society owe much of the interest they have been induced to take in Chinese researches. At the request of the Council, Mr. Wylie kindly undertook to represent the Society at the Congress of Orientalists held at Florence last year, and his appearance there in that position cannot fail to be a source of congratulation to our members.

Although tardy in its appearance owing to the large number of tables contained in it, the Journal of the Society for the past year maintains the position occupied by its predecessors.

The synchronous famines in India and Northern China have called attention to the meteorology of Asia, and in the papers contained within the volume on Famines in China, on Sun Spots and Sun Shadows, and on the Meteorology of Eastern Asia, there is much which will form the ground-work of future research. The curious tables of Sun Spots observed in China long before Europe had an inkling of their existence, and for which we are indebted to Mr. Hosie, of H. B. M.'s Consular service, will doubtless aid, in connection with his other paper on Droughts and Famines in reducing to a regular rule these latter calamities. Toward this end the observations on the meteorology of Eastern Asia, now for the first time tabulated by our distinguished member Dr. H. Fritsche will greatly tend.

Fortunately at their observatory at Sicawei the Reverend Fathers have introduced a system of observations second in completeness to few in the world. Continuous self-recording observations are made on the temperature, barometric pressure, condition of the atmosphere, and the intensity and direction of the magnetic current. These are checked by frequent observ-



ations of the instruments at stated times, so that any irregularity is immediately noticed and corrected.

These extended observations, commenced in 1874, and the first annual record of which was published under the auspices of our Society, have been continued and enlarged from time to time, and the annual record now fills a goodly quarto. Situated as Shanghai is near the northern limit of the summer monsoon of Eastern Asia, and in consequence subjected to excessively variable hygrometric conditions, no better locality could probably have been adopted for the erection of a first class meteorological observatory.

Although within the past year we had no such paper on Natural History as that published in our previous Journal by Dr. von Möllendorff, it will be interesting to members at a distance to learn that the Museum of the Society at Shanghai is gradually extending its sphere of usefulness. Owing to the public spirited liberality of the Municipal Council its most pressing wants have been met by an annual grant. The private liberality of the foreign residents at Shanghai has likewise, during the past year, enriched the library attached to the Museum by the purchase of some four hundred volumes, the property of its late Curator, Mr. Martin. Under the auspices of our present able Honorary Curator Mr. A. A. Fauvel, the space at the disposal of the Museum Committee is found to be becoming gradually straightened, and some steps must be taken to increase the accommodation, if the growth of the Museum is to be continued.

One extremely interesting and important discovery in natural history has, during the past year, been announced by Mr. Fauvel, and that is the discovery of a species of alligator inhabiting the rivers of China, or at least the Yangtsze, whose nearest analogue is to be found in the *Alligator Lucius* of the Mississippi. One of the most recent authorities Mr. A. R. Wallace remarks (Geographical Distribution of Animals, Vol. II., page 406) "The Alligators which are distinguished by having both the large front teeth and the canines fitting into pits of the upper jaw, are confined to the neotropical and the southern part of the nearctic regions from the lower Mississippi and Texas through all tropical America, but they appear to be absent from the Antilles. They are all placed by Dr. Gunther in the single genus *Alligator*." As Alligators have been found in Eocene beds in England accompanied by Gavials and Crocodiles, Mr. Wallace attributes their present distribution to partial ex-

tion. This opinion will doubtless be strengthened by Mr. Fauvel's recent discovery.

In exploration there may be mentioned Captain Gill's journey from England to Assam which was successfully accomplished. Col. Prejevalsky who nearly succeeded in reaching Thibet in 1872 has made a second journey of even more geographical interest in Central Asia to the basin of lake Lob hitherto unvisited by Europeans. Southeast of the lake he discovered a lofty range of mountains, the Altyn Tagh, and also learned some details of the mysterious Charchan of Marco Polo whose identity has been so frequently disputed. Although Col. Prejevalsky certainly penetrated to the basin of lake Lob it seems to admit of doubt whether the lake be discovered occupied the lowest part of the basin. The fact of his describing it as fresh seems to indicate that the ultimate recipient of the waters of the Tarim has yet to be found.

This present winter Count Szechenyi accompanied by Lieut. Kreitner of the I. R. Austrian army and Mr. Loczy, a geologist of repute, has set out on an expedition to explore the unknown country lying between Sühchow in Kansuh and Llasa. It is pleasant to learn that the expedition has me with friendly assistance from the Chinese government. It is much to be hoped in the interests of science that Count Szechenyi's hazardous expedition may be rewarded with the success it deserves.

The members of the Society can hardly fail to take an interest in Professor Nordenskiöld's bold attempt to complete the north-eastern passage. By last advices received the Professor had safely rounded Cape Chelyuskin, the most northerly extremity of Asia, situated in lat.  $77^{\circ} 41'$  N. and had reached the mouth of the Lena, which he left on the 27th of August last to continue his voyage to Behrings Strait. Should he succeed in reaching this point he may be expected in these latitudes towards the beginning of next autumn.

I could have wished that more attention had been paid to the very interesting problems offered by a study of the Ethnology of Eastern Asia. The Chinese section of the Congress of Orientalists at Florence, with the exception of a paper by M. de Rosny on some Ethnographic Identifications relating to Indo-China and Malasia, extracted from ancient Chinese writers, of which no detailed report has been received seems to have confined itself to tracks already too well beaten to be profitable or agreeable. We possess in the ancient writings of the Chinese many valuable indications of the early migrations of Eastern Asia, but understood as these have hitherto been by the unaided glimmer of the Chinese commentators it is a matter of little wonder that the result

has been insignificant. I may be excused for stating my own views on a much controverted point.

Proceeding upwards towards the source of Chinese history our path begins to grow uncertain towards the 5th century B. C.; the seventh century supplies us with little better than legends mixed with historical recollections, and finally, at about 770 B. C. the utmost limit of what we can call consecutive history is reached in the removal eastward of the old capital of Chow and its re-establishment at Loh by P'ing wang. Regarding the destruction of the old capital Mencius (IV. 2 xxi.) tells us "When the traces of the royal sway (of Chow) were extinguished the art of ballad making was lost, and afterwards annals came to be made." 王者述熄而詩亡, 詩然俊春秋佳. The Ch'un ts'iu of Lü begins with the first year of Duke Yin 721 B. C. which is the earliest date in Chinese history for which we can find trustworthy authority. It is not far removed in time from the destruction of the old capital of Chow, yet the short interval of fifty years marks the transition from myth to history.

In the Analects of Confucius, *cir.* 500 B. C., we find that the state was without a head, and that each petty prince in his own territory did as he himself thought fit. Confucius does not seem to have been acquainted with any strong tradition of the imperial government of Chow. He does indeed raise his voice against the assumption by the states of imperial sacrifices, but the traditions of empire in the later sense, if such had ever existed had died out. Rather indeed may we conclude from the opinions of Mencius expressed a century and a half later that they had as yet no existence. "How," said King Siang of Liang, "can the T'ien hia be settled?" The sage replies, "It can only be settled by being united under one sway" (Mencius I. 1. vi.)

The nearest analogue of the T'ien hia in the fifth century B. C. was not the feudal states of Europe in the Middle Ages, as has been thoughtlessly propounded, but Greece in the period succeeding the Persian war. The people of the several states were as proud of their common origin and common speech as were the Hellenes themselves, but the bond was not strong enough to induce concerted action. Chow indeed as the representative of the head of the family enjoyed a preeminence at the sacrifices and at the assemblies of the states, and acted as the eldest son in the family cult; but in the councils of the assembled states the voice of the Wang was heard but as an equal not a suzerain.

Already in the time of Mencius the oracles had commenced to philippize. T'sin loomed on the horizon of the states as Macedon lowered over Athens in the days of Demosthenes. Mencius



sought to excite one of the old stock to unite the conflicting interests of the Chow princes, but the thing was not to be done, and Prince Ching, as T'sin Shi-wang-ti, like Philip of Macedon in Europe, founded the first Chinese empire, to expire as did Philip's in the person of his immediate successor.

Whence came this race of Chow so rich in great names, and which was instrumental in establishing a cult and policy well nigh as lasting as that of ancient Greece?

The ballads spoken of by Mencius afford us an unexpected clue, and a closer inspection opens up to us a treasury of myth and legend comparable in some respects with that of the Hellenes themselves. The idolic character of the writing in which they have been preserved and handed down affords us but little information as to the language in which they were originally compared; we know, however, that at one time<sup>1</sup> the Odes conveyed to the ear the old legends and war songs of the Chows, and though now their sounds are lost, and we have to trust to a laborious analysis of the symbols presented to the eye, we find enough to justify us in identifying the roots with those of the old language of the Vedas, of the Gāthas or of the Hellenic bards themselves.

A prevailing mournful tone is to be noted as underlying the collection; a wail of lamentation at the ceaseless attacks of hostile foes, and this wail rises to its culmination in the latest of the ballads which tell of the final struggle of Chow with its Turkish foes, and the fate of Yü, the *Dark*, and his fair but frail bride Pao-sze (*Priti, Desire*.)

Wan Wang and his sons Wu Wang and Chow Kung do indeed appear in jubilant form in their conquest of Yam shāng. The familiar myth of the contest of light and darkness, which we shall see again reappearing, has woven itself into the tale of the great fight between the Chows and the Yins; its heroes are Ch'ang, the Effulgent (Wan wang), Fat, the Shooter of rays (Wu-wang) and Tan, the Dawn (Chow kung); Wei tsze k'i, the Morning Star and Pak kan the Northern Buckler warn the tyrant Chow<sup>2</sup>-sin or Show (Στυγερὸς or Στῆξ the Odious) of the coming day; Show, however, goes on with his villiany, and with his wife T'anki (Θάνατος, Θνήσκεις) provokes more and more the vengeance of heaven. 'Chow 周 a modification of 書 chow' (the Day) moves towards the doomed state; it occupies first the territory of Li, the region of the agriculturists, the pronunciation of which we learn from its value in proper names<sup>2</sup> was AR (*ar-are* to plough) and prepares for the great contest.

<sup>1</sup> Chinese Classics, V. 549-50.

<sup>2</sup> E. g. Li-kin or Im-tsai-li-kin, Samarkand, in the Shi-ki.

The struggle finally takes place in the east, in the wilderness of the herdsmen, Mûk yê, at the grey of morning. It was to no purpose that Yam shâng mustered its forces; those in front turned their spears on those behind, and the red glare rose higher and higher till at last it floated over the pole star. So the T'ien hia was settled, and Fat, as Wu Wang, the martial, became its ruler.

The mixture of myth and legend is evident. The Chows, Li-min or Aryan men, attack the state of Yin, defeat the pastoral tribes and set up instead their own cult and polity. In the midst of the pœans of victory we find traces of the true reason of their approach. The war was none of their own seeking, and they brought with them a very consistent legend of their wanderings in search of a home.

"When king T'ai (T'an-fû, Danu or Dânavâ) dwelt in Pin (Mencius I. 2. xv.) the Tik tribes continually made incursions. He gave them presents of skins and silks, but could not escape their depredations; he gave them hounds and horses with a like result; he gave them pearls and jade, but still they harassed him. He therefore called the old men and told them 'What the Tiks want is our territory. This I have learnt, that a prince should not turn the sustenance of his people to their detriment. My children, why trouble yourself at the loss of your prince; I will leave you.' Accordingly he left Pin crossed the Liang shan, built a city at the foot of Mount K'i, and established them his government. The people of Pin said 'This is a benevolent man indeed and we must not desert him.' They followed him like crowds returning from market."

The songs of the Shi king are still more explicit in their recital of the migration, but the pith of the story is given above. T'an fu (called after the establishment in China of the kingdom of Chow, King T'ai), forced to flee from Pin to escape the inroads of the Turks who were there harassing the ancestors of the future conquerors of China, settled in K'i chow, the plain adjoining Lake Lob at the foot of the K'i shan, now the T'ien shan, and there set up the original kingdom of Chow. In those days the district was fertile, well watered and covered with wood, and the rising state seemed about to become powerful under its energetic rulers. To the south lay the state of Madh or 密 Madh-su 密須, *i. e.* Maddhal, with whose rulers the Chows soon came into hostile contact. Chow was victorious and the city of T'sung yung *i. e.* Dardan, the Charchan of Marco Polo was captured. Its great drum was long preserved, and we find it many centuries after still preserved in Tsin as a memorial of the contest.

The Liang shan crossed by the emigrants is phonetically con-

nected with the T'sung ling of later Chinese, and both point to an original form Dar. We thus learn that the mountains, crossed by Tan fu in his migration were those of the Dards, the *T'sung ling* of to-day; and this step takes us back to the previous seat of the Chows in the land of Pin.

Like K'i chow the settlement of Pin was not the original home of the Chows. Where that was the Chinese legends afford us no clue, but we do learn from the Shi king that unable to dwell at ease in their ancient home the tribe under the leadership of Kung liu crossed the Wei (? Oxus called 魏 kwei or wei by Sze-ma Tsien) and settled in the highlands of Pin along the valley of the Hwang (Varsha, possibly the Vaksh.)

We are here brought into contact with the original birth place of Aryan legend, and there may therefore be the less surprise should I ask you to identify Kung liu of the Chinese legend with the Kereçappa, the serpent slayer, of the Iranians. Both are too near the extreme verge of legend to enable us to fix upon any definite act of their lives, but both seem to have been wanderers from their home. The Vendidad hints that Kereshaçpa took to witchcraft, and the Yaçna tells of how, having inadvertently placed his cauldron on the green slimy serpent, Çruvara, the serpent sprung up and Kereçaspa fled. The more modern legends of the Persians make Gersharp the last of the Pishdadians, who having reigned only nine years disappeared leaving no successor.

It is curious that the word kereçappa (in Zend *lean horse*) is evidently a corrupted form. The change of a single letter kere-daçpa instead of kereçappa, *i. e.* the '*maker whole*,' gives a meaning to the legend of the serpent slayer, and accounts by the ordinary change of *d* to *l* for the Chinese form Kung-liu.

The usually received dates tally as closely as traditional epochs can be expected to do. The Chinese have fixed approximately on 1800 B. C. as the date of Kung liu's settlement, and according to the Avesta Kereçappa was antecedent to Zarathustra whom we most seemingly relegate to the sixteenth century B. C. The Turanian Franraçê was hanging at the time on the borders of the Iranian settlements and the latter found existence scarcely supportable. That a portion of the tribe should have emigrated eastward is in consonance with all we know of the migrations of the early inhabitants of Central Asia.

There are possibly traces of the old settlement of Pin to be found in the names of various localities of the Pamir, if that name itself, as suggested by Sir Henry Rawlinson be not a corruption of some such form as Pân-mir or Fân-mir, the lake country of Pân or Fân. There still exist the Fân tau, the Fân lake, etc. and



Strabo XI. 11 speaks of the *Φαυνοὶ* or *Φρυνοὶ* as bounding to the east the Bactrian kingdom.

The explanation I have offered, but merely in outline, reserving details for some other occasion, will serve to account for many peculiarities in the Chinese cult and Chinese tradition, and is not inconsistent with what we know from other sources of the original dispersion of the Aryas. Indian tradition points to the same period as having witnessed the southern migration of some of the tribes, while Persian legends tell of their settlements in Mid-Asia. The Aryan migration to China is in many respects similar to that into India. In both cases the Aryans penetrated into countries previously inhabited, and impressed on the original inhabitants their language, cult and polity. There is, however, one broad distinction to be noted. In India the early establishment of caste kept apart the conquerors and the conquered, and has preserved to the present day in more or less purity the original type. In China, though for a time the settlers kept themselves distinct from the people of the land, the traditions of difference of race were gradually relaxed, and we soon find that the Aryan Chows did not hesitate to admit into their family by adoption those neighbouring states whose power or influence was sufficiently great to make their alliance desirable.

The most remarkable instance of this practice was in the case of Wû, where a genealogy leading up to T'ai pak the eldest brother of Ki lik, and therefore if true constituting them the representatives of the eldest branch, was found for the rulers of the state. It is curious to observe that on one occasion when the various princes met at Hwang ch'i to discuss the position of affairs, Wû actually raised a claim on this genealogy to the headship of the states. The claim was indignantly repelled by Tsin as head of the Ki clan and might have led to bloodshed, but that at the moment a messenger arrived to tell the prince of Wû of the invasion and impending destruction of his state. The connection of Wû with the other states had all along been looked upon as something disreputable by those of the genuine stock, but these little discrepancies had to be passed over so long as Wû occupied a position of power; and when finally it collapsed as an overblown bubble, its fall was so complete that it was not worth while erasing its name from the family records.

The same process went on all round, T'sin and T'sû were adopted into the confederacy, and at one time the preliminary steps were taken for admitting the Hiung nû, and a genealogy lending up to the Great Yü was actually prepared.

This policy was not long in making itself felt. The Chows in-

deed succeeded in impressing their cult and laws on China, and to a very considerable extent their language, fully half the roots of modern Chinese being traceable to Aryan sources. The admixture of race told, however, rapidly on the speech of their descendants, and it soon lost its inflected form, and even before the rise of T'sin had assumed in great measure its present monosyllabic form. The race characteristics of the Chows gradually died out, as race characteristics usually do where a limited number of immigrants settle in an already inhabited country, and freely ally themselves with the original stock. It is only, in fact, by a laborious process of elimination that we find in the Chinese of to-day lingering traces of the Aryan occupation.

A closer search, however, discloses remains of a partial immigration antecedent to that of the Chows; and on these traces, slender though they be has been erected the fabric of the so-called ancient history of China. It may be remembered that Chow at the battle of Mûk yê vanquished the forces of Yin, but the manner in which, according to tradition, the victory was utilized shows that even in the conquest of the tribe its consanguinity was recognised. Wei tsze k'i, who had fled to meet the coming dawn, was appointed to continue the sacrifices of Yin; and we find the rulers of the petty state of Sung 宋 claiming within historic times the honour of being his descendants. Sung possessed legends of the contest of dawn with darkness as definite as those of Chow itself, and couched under names only dialectically different and betokening as plainly an Aryan origin. In Greece where each city believed its inhabitants antochthonous these differing versions of a common story would have been allowed to remain separate and distinct, but in China they were made to form a thread of quasi connected history, and hence it became necessary to invent a prior invasion of a previously degraded race. Hence the invention of the dynasty of Hia (Hari) and the foisting into it of the old gods gradually displaced by the growing pantheism of the settlers. Hence the legend of T'ang corresponds even to its details with that of Wan and Wu wangs, and the descendants of Yaou, Shun and Yü (Varuna, Vishnu and Manu) end in the miserable Kit (Σκοτός) and his wife Mehi (Megha the Cloud.)

Even beyond Yin T'su seems apparently to have had traces of Aryan influence. The few words of the language preserved, which we learn from Mencius was unintelligible to the rest of China are referable to Aryan roots. Still the jealousy with which T'su's march to power was regarded by the other states and the prolonged refusal to consider it as other than barbarian, seems to



point out that the traces must even then have been very indistinct.

It would not be possible within the limits permitted to an address like the present to point out in detail all the reasons which have led me to form these conclusions. I have brought them forward in the hope that other students of the antiquities of China may turn their attention to the very fertile ethnological field which lies before them. Facts we know are very stubborn things and not to be controverted with impunity, but the same immunity does not rest with the conclusions we may be tempted to draw from them. In no science are these conclusions more open to animadversion in its present condition than in that of ethnology, and I trust that my hearers, while giving me credit for a careful collation of facts, will not assume that the conclusions I have drawn are in any sense incontrovertible.

Those, however, who have watched the progress made in Europe by means of comparative study, towards gaining an insight into the original condition of the Aryan family, will not lightly slight any traces, however slender of their influence in Eastern Asia. No sufficient explanation has yet been afforded for the remarkable coincidences between the early Chinese cult and civilisation and that of Western Asia and Southern Europe. The near approach in time of the origin of two, and the evidence of early intercommunication in the identity of their astronomical and calendaric systems, has always been accepted as a proof that intercourse between the two did exist in times immediately antecedent to history. The nature of this intercourse has hitherto been concealed, because when history opens the intrusion of the Turkish tribes had already placed an impassible barrier between east and west. It is therefore a matter of interest to discover that the effect of this intrusion was to drive eastwards a portion of the mid-Asian peoples, because it not only throws light on Chinese ethnology, but also aids us to understand better the Iranian legends of the pressure of the barbaric tribes on their own frontiers.

In a previous address I pointed out what seemed to me the exciting cause of the irruption of the Turkish tribes into Central Asia; but as this trends on geological enquiries, and I do not propose to renew them this evening, I shall close by recommending to the members of the Society and others interested in the antiquities of the Far East a reconsideration of the ethnological question.

The progress of ethnological and philological science has been much retarded by the apparently necessary assumption that the Chinese language and Chinese arts had to be relegated to an inde-

pendent origin. The fiction of inflective and agglutinative languages has also been a retarding influence. The fact seems to be that all languages are liable to pass through both stages. Sanscrit is a language only just emerged from the agglutinative stage, and Chinese seems to be one which after adopting inflections has gone back to the former condition.

A third fallacy I have to warn students of Chinese against is the misuse of the word Turanian as applied to peoples and tongues. According to Persian tradition Tûr was equally with Selm and Iredj the son of Feridûn. The modern use of the term Turanian to include all tribes in northern and eastern Asia not supposed to be Aryan has no foundation in fact or tradition.



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ARTICLE I.

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ALLIGATORS IN CHINA.\*

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BY

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IF we consult the oldest of all Chinese records, the Classics, in which most of the natural productions of the country are noted, we find in the twenty-sixth chapter of the Doctrine of the Mean (1) a curious enumeration of the wild animals living in the waters. In Dr. Legge's translation it runs as follows:—"The water now before us appears but a ladleful; yet extending our view to its unfathomable depths, the largest tortoises, *iguanas*, *iguanodons*, dragons, fishes and turtles are produced in them."

(電 鼉 蛟 龍 魚 鼈 生 焉。) (Yüan t'ò chiao lung yü)

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\* Read before the Society on the 13th December, 1878.

(1) 中庸. 二十六章. 九節.

*pieh sheng yen.*) The Chinese commentary (中庸說) on this passage defines the *Yüan* 鼃 as 'the first produced of the chelonia' (介蟲之元); the *Lung* 龍 as 'the chief of scaly animals'; the *Pieh* 鼈 as being 'a kind of *Yüan*'; the *Chiao* 蛟 as being 'a kind of *Lung* 龍'; while the *T'ö* 鼉 'has scales like a fish, feet like a dragon, and is related to the *Yüan*.' From this we may infer that the *T'ö* is an amphibian with feet and scales and allied to the chelonians.

The *Li Ki* (禮記) says: "in the ninth moon they kill the *Chiao* and capture *T'ö*" (to be sent to the palace of the Emperor where drums are made from its skin, according to the commentators.)

Proceeding further, we find in the 4th stanza of the eighth ode of the *Shih King*, decade of *King Wang* (2) the following sentence:—鼉鼓逢逢 *T'ö ku peng peng*, translated by Dr. Legge "The lizard-skin drums rolled harmonious." The commentary is the same as the preceding one, indeed we find it in every book quoting the *T'ö*.

In the Doctrine of the Mean, Dr. Legge translates *T'ö* by *Iguana*, and in the *Shih King*, he gives *Lizard*. Not knowing, probably, of the existence of crocodilians in China he was left with Chinese dictionaries to determine the exact meaning of the character *T'ö* (鼉), and I must say that the ambiguity of their statements is such as to render it difficult to get at their exact meaning.

Now, according to *Choo's* commentary quoted by the translator (Dr. Legge), the great drum was eight cubits in length and four cubits in diameter at both ends. Other Chinese authors say that it was made with the skin of the *T'ö*. How could it be covered with the skin of the *Iguana*, which never exceeds five feet in length, or with the skin of a lizard which is far too thin and too small for even the smallest of drums? Besides the *Iguana* cannot be said to be produced in the waters with fishes, chelonians, turtles, etc., for it is not an amphibian animal, and I have never heard of it being found in China. I could say the same of *Iguanodons*. The *T'ö* then is not an *Iguana*; let us now try to make out, with the help of the Chinese dictionaries, the exact meaning of the character 鼉.

One of the oldest, the *Shuo Wen* (說文) says: The *T'ö* is an aquatic reptilian (水蟲) (3) resembling the lizard (蜥蜴)

(2) 詩經. 大雅三. 靈臺. 四章.

(3) Dr. Legge translates 鼉 chelonian (see above.)

and measuring over ten feet in length. A lizard of this size can only be a kind of crocodile or Alligator.

In *Kang Hi's dictionary* (康熙字典) we find, besides the above quotation of the *Shuo Wen*, that the *T'o* has scales as hard as iron and a very thick skin good for making drums. Then quoting the *Shih King* it explains how the sound of drums (逢逢) *peng peng* resembles the call of the *T'o*. This is certainly an example of onomatopœia as anybody who has heard the cry of the Alligator can testify. Indeed we believe that the very name *T'o* is an imitation of the explosive noise made by the Alligator. The word *resounded* would be a far better translation than the *rolled harmoniously* of Dr. Legge's. Whatever might be the idea of Chinese commentators about music it is difficult to find much harmony in the noise generated by striking a huge drum with a mallet. The Chinese had observed the similarity of the two sounds as the *Po Wu Chih* (博物志) (4) quoted by the *Kang Hi's dictionary*, says: "The *T'o* is ten feet long; it makes a noise like a drum." *Cheng Chi* (藏器) considers the cry of the *T'o* as far from harmonious, indeed he says, it is very terrible. "It cries (at night) at each watch (5); thence the phrases: strike the watches *T'o keng*, beat the drums *T'o ku*." (See *Pen Tsao Kang Mu*).

The Great Materia Medica (本草綱目 *Pen Tsao Kang Mu*) (6) being a scientific work will probably give us a better description than any dictionary. It gives 鼉龍 *T'o* dragon, 鮀魚 *T'o* fish and 土龍 earth dragon as synonyms. It says: "The nature of the *T'o* resembles that of the dragon. It measures 10 feet in length and belongs not to the family of fishes but to the family of dragons." According to *Li Shih-chen* the character 鼉 is an old graphic representation of the head, body, feet and tail of the animal. The oldest form of this character we find figured like this 鼉 in Morrison's Dictionary. It is composed of the two characters 單 *tan* alone and 黽 *min* a frog. According to the *Po Wu Chih* the *T'o* 鼉 is a land dragon and the *T'o* 鮀 a fish."

The author *Cheng Chi* (藏器) quoted by the *Pen Tsao* says that the *T'o* is of a sleepy nature, often closing its eyes. It is

(4) Written in the latter part of the 3rd century.

(5) These watches were struck every two hours with a drum, now a gong or a hollow bamboo is used.

(6) Written by Li Shih-chen under the Ming dynasty.



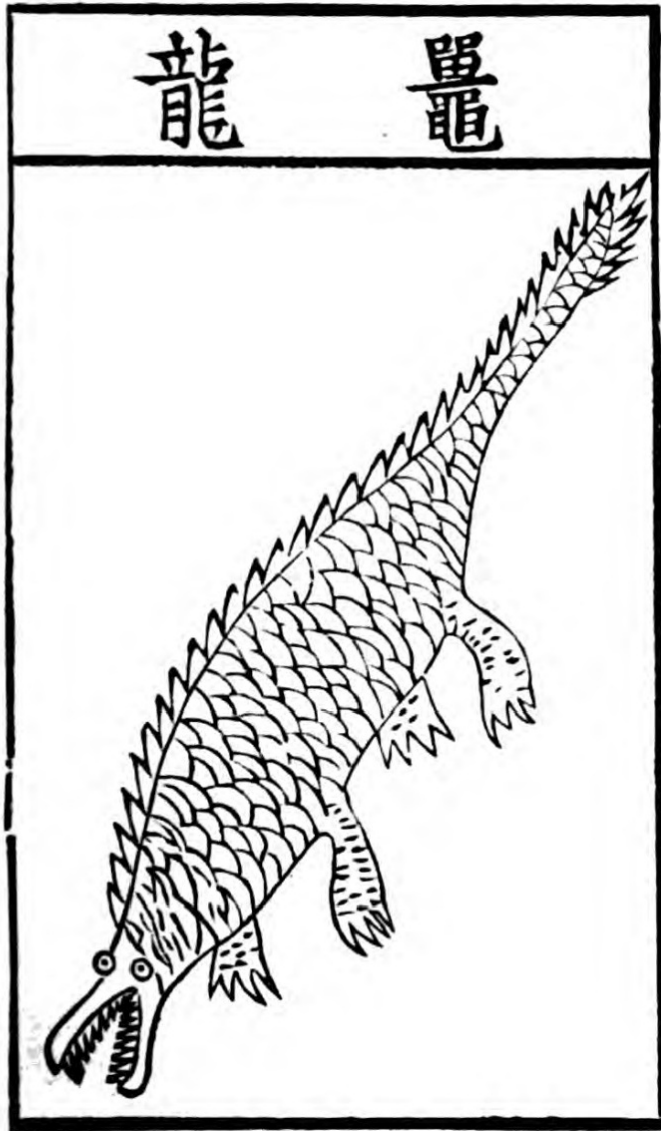
gifted with *great strength* and can burrow in the banks of rivers. *Sung* (頌) writing under the Ming dynasty says that they are *extremely numerous in the lakes and rivers*. According to this author it resembles the Gecko and the Pangolin (*Manis pentadactyla*?) but measures from ten to twenty feet in length, its back and tail are covered with an armour (甲). It cries at night and the mariners are much afraid of it. *Li Shih-chen* says that its burrow is very deep. The sailors catch it with a rope made of bamboo, at the end of which is an iron hook baited with flesh. The animal, having swallowed it, is pulled out of its hole little by little. It can move to either side, but cannot jump. It lays a considerable number of eggs, sometimes as many as a hundred, but it often devours them. The people of the south are very fond of its flesh and serve it (as a delicacy) in every marriage feast. *Lu Tien* (陸佃) pretends that the flesh of the body is as good as that of cattle, but that of the tail is unwholesome.

The Kuang records of *Kuo Yi Kung* (郭義恭) say that the fish *T'ao* is three feet in length, and about one in height. Besides four feet it has a tail resembling that of the *Yen-ting* (蜃蜃) (*Lacerta muralis* or *Chamaeleon*) but much longer. It is the custom of the people of the south to eat the flesh of the *T'ao* when they celebrate a marriage ceremony.

A little further it is related that at the time the Emperor *Wei Wu* (魏武) was returning from Hupeh into Honan a *T'ao* was found underground by a man who was digging in the fields.

Here we find the measurements a great deal more accurate (though perhaps the exaggeration is the other way) as the Alligator actually living in China is from five to six feet long. The height given is sufficiently accurate and the comparison with the lizard leaves no doubt concerning the nature of the *T'ao*.

With the exception of the sentence concerning the flesh of the tail, all the description given by the Pen tsao and the Kuang records agrees wonderfully with all that we know of the nature and habits of the Alligators of the Mississippi and Guyana, as described by Audubon, Whatterton and Bosc. Even the way of catching the animal is similar, only the Indians use an iron chain fastened to a tree as a substitute for the bamboo rope. Indeed we cannot doubt the identity of the *T'ao* with the Alligator when we consider the somewhat quaint but sufficiently characteristic picture which illustrates the text of the Pen tsao. As may be seen by this reproduction of it.



We have here the head of a crocodilian pretty well brought out. In the Japanese edition of the *Shih King* a figure of a Gangetic gharial is given for the *T'ao* but it is very curious to notice that the artist represents it as being in a glass jar! (7)

After examination of the testimony given by the Chinese dictionaries, commentaries and scientific works we come to the conclusion that the *T'ao* must be an Alligator.

Let us now see what the foreign dictionaries say on the subject.

One of the oldest, Gonçalves, translates *T'ao*: Crocodilo. De Guignes, who is now said to have copied B. de Glemona gives 鼉 *T'ao* a crocodile and 蛟 *Chiao* a crocodile.

(7) Probably as he had seen it in some museum.



Morrison, whose dictionary is anterior to Legge's classics, gives the following description, evidently translated from native works: 鼉 *T'o* a large sea (?) animal, upwards of ten feet long, a species of fish, its skin was formerly used to make large drums (8). 鼉龍 *T'o Lung*; an animal resembling an *Alligator*.

Medhurst's dictionary printed at Parapattan, Batavia, in 1843, translates the *Kang Hi Tsze Tien* and gives: A species of Guana or Iguana, about ten feet long. In this he evidently trusts his imagination as we have already proved that it cannot be that animal.

Finally, the best of all Chinese-Foreign dictionaries, Dr. W. William's work gives 鼉 *T'o* "A large triton, gavial, or water-lizard, found to the South of China." Then he translates the Imperial Dictionary (the *Kang Hi Tsze Tien*) and far from finding the melody of the sacred drums harmonious he translates the famous quotation of the *Shih King* by the less poetical but far more sensible phrase: "The bass roar of the drums" in which by the way *T'o* is not translated at all.

So much for the character *T'o* and its meaning, but this old ideographic sign is not the only one by which the crocodile or Alligator is designated in Chinese books.

If we search the *Tai-ping Yü-lan* (9) for this character 鰐 (10) we find a long chapter headed:

鰐魚 *Ngo yü*.—The fish *Ngo*.

Quoting the "Chronicles of Foreign Countries under the Wu Dynasty (222-277 A.D.)," (11) it says:—The fish *Ngo* measures from twenty to thirty feet in length, it has four feet, and resembles the warden of the palace (守宮 a poetical name for the Gecko), and can swallow a man. Speaking of those found in the kingdom of *Lin Yi* (林邑 Southern Cochin-China), it says in shape they look like the *T'o*. They have four feet and their jaws, which are six or seven feet long, possess, on each side, teeth as sharp as daggers. They devour every deer, stag, or even man they can get hold of. According to the encyclopedia of *Yü Hsi* (虞喜志林) Alligators are found in the south, their jaws are eight feet long. They are very terrible in

(8) Said to breathe a vapour from its mouth, which forms a cloud and cause rain.

(9) 太平御覽卷九百三十八.

(10) Formed from 魚 a fish and 𪚩 frightening abbreviated 𪚩.

(11) 吳時外國傳.

autumn. When they see men on a ship's side they raise their heads above the water, seize and devour the mariners, who, in consequence always provide themselves with spears for defence.

The *P'o Wu Chih* (博物志), description of all productions, says that they are found in the Canton district and resemble the tortoise. If the head is cut, and the teeth knocked out, they will grow again, as many as three times. We find the same description and measurements, as quoted above, in the records of the curiosities of *Kuang-chou* (province of Kuang-tung), but the story of the teeth growing again is more sensibly told, "If the teeth are knocked out, they can grow again in the space of ten days."

The book called "*Lin Piao Lü Yi*" (嶺表錄異) is the only one that gives the colour of the body, an earthy yellow. It also compares it to the gecko, but says it is more rapid in its movements. All pretend that men and animals fear it equally. It seizes deer and tigers when crossing the water and tears them to pieces.

All these characters are common to the 鼉, and as we will yet demonstrate later on, the animal described under the four characters—鼉, 鱷, 鰐, 蛇 is the Alligator. 鼉 being the oldest form of the character 鱷, which by the way is not found in the classics; and 鰐 or 蛇 are the common forms of character now used. Gonçalves translates: 鱷 and 鰐 *Crocodilo*, and 蛇 by *Cação*. De Guignes gives *Crocodylus* as signification of the first and second character, and *quidam piscis* for the third. Morrison has: 鱷 = 鰐 or 鰐魚, a large fish of the lizard species which lurks by the shore and devours men and animals; the Alligator.

In Medhurst's dictionary we find:—

鰐 *Go*.—The Alligator or Crocodile. They are found in the South seas of China (12). The natives say that after the head has been cut off and dried, if the teeth are knocked out, they will appear again three times in succession. The Alligator is about twenty feet long with four legs, and a head three feet in length, with a very pointed nose. It has tiger's teeth, and can bite in two large stags, that attempt to cross the water. *Han Wen-kung* (韓文公) published an essay to drive the Alligators from

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(12) This is probably a misconstruction of the Chinese 南海 which stands also for 南海縣 *Nan-hai-hsien*, the district of Canton, as it is well-known that Alligators do not live in sea-water.

the coast of Canton, and the natives say those beasts have not been seen there since.

**鯢** *Go*.—An Alligator described as having the form of a fish, with a dragon's neck, tiger's claws, crab's eyes, turtle scales, a tail several feet long, and very rugged along the spine. It abounds on the banks of rivers, where it frequently takes off men and animals. Medhurst then quotes *Han Wen-kung*.—All this is evidently translated from native works.

**鼈** *Tho*.—Another account says that it is found near the banks of lakes, where it burrows in the mud; its form is like a lizard upwards of ten feet long, and its back and tail are covered with scales.

Evidently the Alligator again (same article in Morrison's dictionary).

Morrison's dictionary explains this last character **蛟** *Keaou* to mean:—A kind of *Crocodile*, found in the *Yang Tsze Kiang*, said to weigh two thousand catties, etc., as above. Gonçalves calls it also: *esp. de Crocodilo*.

In Dr. William's dictionary we find:—

**鯢**.—From **魚** *yü* fish and **噩** *ngo* alarming, as the phonetic. The crocodile and the Gangetic gavial; the former is said to have existed at one time in the River Han, near Swatow, whence they were exorcised in the Tang dynasty; metaphorically rapacious cruel, for example: **鯢紳劣吏朋比爲奸**.

“The rapacious gentry and unscrupulous underlings make a worthy union of rascals.”

**鯢魚** *Ngo yü*: an *Alligator*, cayman, or crocodile; it seems to be sometimes wrongly applied to fresh water dolphins.”

Also written **鼉** *Ngo* from *yü* fish and *ngo*, 罍 to startle, to strike the drum at intervals of singing. This reminds us of use of the skin of the animal.

According to Dr. William's **鼈** *T'o* would be a species of bull-head which burrows in the mud, and he gives:—

**蛟** *Chiao*.—“The dragon of thickets and morasses, which has scales, but no horn; the description size and figure correspond very nearly to the fossil *Iguanodon*, and possibly a large kind of *Salamandra* or *Amblyrinchus* was at first intended.” To this, we can say, that an *Iguanodon* with scales and without horn looks very much like a crocodile poorly drawn; besides the *Iguanodon* belongs to the inferior cretaceous formation which as far as we know has not yet been found in China.

We have indeed seen large collections of fossil teeth in the medicine shops of Shanghai and we have a pretty good num-

ber in the R. A. S. museum, still the very characteristic tooth of the Iguanodon has never been met with.

The crocodile being larger than the Alligator we understand the differences of weight and measurements given by Chinese authors, putting aside some misstatements or wrong descriptions. The crocodile being more ferocious than the sleepy and harmless Alligator we understand also why they used to capture the latter and kill the former.

It is also evident from all these native descriptions that the Chinese had heard of, and some of their travellers to India probably had seen the Gangetic gavial and crocodile, hence their conflicting statements. Even in Europe unscientific people often confound the crocodile with the Alligator more vulgarly known as cayman, the name given to it by the Indians and negroes in America.

As a *resumé* and conclusion of this philological discussion which we now bring to a close, having Chinese dictionaries and encyclopedias in one hand; old records, natural history and Chinese and Foreign dictionaries in the other I propose to translate 鼉 T'o by Alligator as well as 鼉 or its abbreviated form 鼉.

蛟龍 will mean the crocodile or the gavial class of animals. The classical quotation of the Doctrine of the Mean:

鼉, 鼉, 蛟龍, 魚鼉生焉 Yuan, t'o, chiao lung, yü pieh sheng yen I should translate:

"The great tortoise, the Alligator, the crocodile, the fish and the turtle are produced in the water."

The phrase of the *Shih-King*:

鼉鼓逢逢 T'o ku peng peng, should be understood as: "the alligator-skin drums <sup>are</sup> <sub>were</sub> resounding," and these words of the *Li-Ki*:

季秋之月伐蛟取鼉

would mean: "About the time of the ninth moon they kill the crocodile and capture the Alligator."

## II.—HISTORY AND LEGENDS.

In the works of Han Wen-kung 韓文公(13) also called Han yü 韓愈, a celebrated statesman and poet who lived under the

(13) 韓文公詩增註.



dynasty of the Tang (A. D. 768-924) we find this. When *Han yü* was banished and sent to fill the post of governor in the semi-barbarous region of *Chao chou* (潮州) in the modern province of *Kuang-tung* (廣東), he enquired of the people as to the state of the country and the miseries of the inhabitants. They answered him that at a place in the east of the city there was a small lake or marsh not far from *Chao yang hsien* (潮陽縣) (14) called the "*Chiu waters*" (秋水). It was full of *Ngo fishes* 鰐魚 hatched from eggs and some ten to twenty feet long, which devoured the cattle and other domestic animals, thus gradually exterminating them to the consequent impoverishment of the people. A few days after *Han-yü* went to this place and calling his officer *Chin chi* ordered him to have a pig and a sheep thrown to the *Ngo fishes* which he then addressed as follows:—

Under former rulers you have been allowed to remain here, but under the reign of our virtuous emperor you cannot be tolerated and you must leave his empire. How could you be permitted to live here in peace when you are molesting the people fattening on their domestic animals and increasing daily in number? I have come to rule this country in the name of the sovereign and as I am myself much afraid of you we must part company. At the south of this place is an immense sea in which fishes as large as whales as well as those as small as shrimps and sprats can live in peace. You can easily go there in a day but I give you from three to seven days to go. If after that period you are still found here I shall be compelled to bring with me some good archers with strong bows and poisoned arrows and declare against you a merciless war.

In the afternoon of that very day a violent wind arose accompanied by thunder and lightning. The storm raged for a few days driving the waters sixty *li* eastwards leaving the lake perfectly dry. Since this the *Ngo fishes* have disappeared and the people of *Chao chou* live in peace.

On the native maps of the province of Canton we find still to the west of *Ho Yuan hsien* (河源縣) 110 miles west of *Chao chou* a small lake called 鰐湖 *Ngo hu*, i.e. Alligators' lake.

This story we have also found slightly abridged in the *Annals of the province of Kuang-tung* (廣東通志).

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(14) Opposite Swatow.

According to Mr. W. F. Mayers<sup>(15)</sup> this is simply a legend symbolizing the efforts made by *Han Yü* in civilizing the rude inhabitants of the country. But it was during the reigns of the Tang, far from the mythological times, and this story agrees with what we know of Alligators, and as they are still found in the province of Canton, as this paper will show before concluding we think it quite possible that they were really in existence there, and then, and even before. Indeed, the *Ngo* are mentioned in the "Annals of Foreign Countries during the Wu" (222-277 A. D.) where we find them sufficiently well described to leave no doubt of their crocodilian nature. The book of the Liang dynasty (502-556 A. D.) says that in the kingdom of *Lin Yi* (林邑) now southern Cochin-China, crocodiles (*Ngo*) are reared in the moats of the capital as well as in the enclosure where, outside the gates of the city, the wild beasts are kept. Criminals are thrown to them. If during three days they are left unharmed by the animals, they are considered innocent and restored to liberty. These crocodiles measure twenty or more feet in length and resemble the *T'o* (Alligator). There is no mistake possible here, as crocodiles are still found abundantly in Siam. They belong to a variety only known there, thence their name *Crocodilus Siamensis*. The Chinese book adds that they are very ferocious and that they are also found in *Tsang Wu* (蒼梧) (southern Kuangsi?) as well as in foreign countries.

The "Annals of Foreign Countries" (222-277 A.D.) also narrates that the King of *Fu Nan* (扶南) by name *Fan Ch'un* (范尋) had crocodiles (*Ngo*) brought to him and kept them in a pond. Rebels and criminals were thrown to them and released as innocent if left unharmed by these saurians. The kingdom of *Fu Nan* is probably Tonquin where crocodiles are still found.

In the Annals of Annam (交州 *Chiao chou*) we find that crocodiles like to come out from the waters on to the sand where they lay eggs about the size of those of a goose and good to eat. They seize tigers, deer and stags when they cross the water, tear them to pieces and devour them. They even attack man now and then. If their teeth are knocked out they will grow again in the space of ten days.

We now come to China proper. In old times, says the book called *Ling Piao Lü Yi* (嶺表錄異), a military mandarin (called 李 in the *Kuang-tung* Annals) was coming to *Chao chou* (湖州). As his boat was passing the Alligators rapid (鱷魚灘)

(15) The Chinese Readers' Manual article Han yü.

it struck on a rock and was wrecked. All the accumulated treasures of this officer, his books, vases, pictures and maps were lost in the deep. He called his mariners and ordered them to dive in order to recover them if possible. But these men saw so many Alligators under water that they did not dare to rescue the lost treasures, believing that they had come to the private residence of the monsters. So it is not only Han Yü who saw Alligators near Chao chou.

The Canton province is not the only one mentioned as producing the *T'o* or *Ngo*. In the chapter headed Imperial audiences (王會) of the *Shi Chia Chou Shu* (汲冢周書) that is: Discoveries made in tombs, we find that the people of Hang chou fu in Chekiang send the *T'o* as a tribute to the Emperor, to make the court drums with the skin, as the commentator explains.

With this we will close our quotations from Chinese history and give a few of the legends concerning the crocodiles or Alligators.

THE Chinese have an idea that the Alligator is wonderfully tenacious of life. The Canton annals say that the head can be cut and dried, before the animal dies, the muzzle can be broken into pieces and all the teeth pulled out and still it lives.

The history of the Wu dynasty tells us that in the first year of the reign of *Sun Liang* (孫亮) white barking Alligators or crocodiles were found in *Kung An* (公安). It is a common belief there that when the *T'o* barks and the back of the tortoise becomes flat, a dreadful calamity is surely impending from which people can only save themselves by fleeing to *Nan Chun* (南郡), now the city of *Nan Cheng* in Kiangsi. And indeed in the second year of *Sun Liang* a rebellion arose in *Kung An* and a mandarin called *Ch'u Ko-ch'ieh* (諸葛恪) was defeated by the rebels; his younger brother *Ch'u Ko-jung* (諸葛融) mandarin in *Kung An* was taken prisoner by them. His seal of office was made of gold cast in the shape of a tortoise. In his grief he scraped the back of the tortoise and swallowed the gold so obtained, which gold caused his death.

The book of *Chuang Tszs* (莊子) says that as Confucius was visiting the bridge of *Lü Liang* (in Shantung) the water rose twenty-four *chang* and rushed with great impetuosity over thirty *li* of country. The *Yuan* 鼃 and the *T'o* 鼉 did not dare



to risk themselves in the waters but the sage saw a man swimming across some hundred *pu* (about a mile). When he came out Confucius asked him how he had managed. The man answered: "my nature does not fear, my destiny is certain I will follow the strength of the waters. It was because I had no fear that I succeeded in crossing the waters, I really had no other means."

In the *Ch'un Chiu* of *Lü Shih* (呂私春秋) we read that the emperor *Ch'üang Hsü* (顓頊) ordered *Fei Lung* (飛龍) to make a musical instrument of eight sounds (a kind of mouth organ) for the ceremonies of the cult of *Shang Ti*. When this instrument was used for the first time a *T'o* which was near the place kept measure with the melody by striking his tail against his body.

The records of *So Shen* (搜神記) narrate that in Honan a man named *Chang Fu* (張福), being one night in his boat, saw a woman coming in a small canoe. When she came near him she said: "When night comes in I dare not go out as I fear the tiger." *Chang Fu* at first laughs at her then he invites her to come and spend the night with him on his boat. About midnight as the moon was rising in the sky, *Chang Fu* (waking) saw a white *T'o* sleeping on his arm instead of the woman. Greatly afraid he rose up and the animal fled, the man saw then that what he had taken for a small boat was simply an old wooden log.

In the book on foreign countries written by the Buddhist priest *Cheh Seng* (玄僧) we find that in the kingdom of *私訶條* (*Ssu Ho Tiao*) on the mountain called *Ch'uan Tao Leao* (全道遼) is the temple of *Pi Ho Lo* (毗訶羅); there a stone figure of a *T'o* is adored. This image is said to possess a supernatural power and when provisions are scarce at the monastery the priests address to it their prayers and their stores are soon replenished.

The records of *Hsü Shih* (許氏志怪) narrate the following story: A Buddhist priest, by name *Yao*, being a sorcerer and an exorcist was once called in (the city of) *Kuang Lin* to exorcise a woman named *Wang* who was possessed. Upon entering her house *Yao* knew that she was possessed by the spirit of a *T'o*, so he scolded this spirit insulting it and asking it why it had entered the body of that woman. *Wang* answered "a man wants to kill my husband." The devil who was near her answered: "I am exceedingly sad for I know that to-day I must die." It wept and moaned. To this *Yao* said "I know



it is a spirit and cannot fight with it." The neighbours heard these words and then saw a *T'o* coming out, it was killed by Yao.

In the book called *Yu Min Lou* (幽明錄) we find the following legend:—

At the time of the emperor *Yung Chou* of the Sung dynasty a mandarin named *Chang Chun* (張春) being in office (*Che-fu*) at *Wu Chang* (武昌) in Hupeh was marrying his daughter. Just as she was getting into her carriage she went mad and on the road struck every man she met declaring she would not marry. A countryman, who was a sorcerer, saw the young lady and understood her to be possessed by the spirit of the tortoise (魅邪). He said that he could cure her by taking her to the bank of a river and there beating a drum. *Chang Chun* having heard of this believed that the man was an impostor (was lying) so he ordered him to bring the tortoise (*Kuei*). A green snake came first and was transfixed with a nail by the sorcerer. Towards midday a great tortoise was seen issuing from the waters, the sorcerer taking a vermilion pencil traced on its back a mystic character and ordered the animal to return to the waters. At evening time a large white *T'o* was seen in the middle of the river rising and plunging as the tortoise pursued it. The *T'o* died, the damsel wept bitterly on what she called the death of her husband and little by little she returned to her senses. As people were questioning which of the three animals had caused the sickness of the lady the sorcerer said: "The green snake was the messenger who informed me, the turtle is a lover and the *T'o* was the husband of the woman." He then brought the three animals to *Chang Chun* who saw that he had not been false (made a lie.)

In the *Pen Tsao* we find that it requires just the same number of men to pull a *T'o* out of its hole as would be needed to dig it out; otherwise it is impossible to capture it. When it cries the country people know that rain is coming. The same book gives a rather curious method of killing and flaying the Alligator. The mode is as follows: pour boiling water down its throat; after a certain time (rather long I fear) it will die then you can peel off the skin.

Of course such a curious animal akin to the dragon must be used in the materia medica of the Chinese. The scales are found in most of the druggist shops under the name of *Lin Yü Chia* (鱗魚甲). It is mostly procured in the district of Canton where according to the *Pen Tsao* it can always be found.

These scales are said to be sour, slightly warm and a little poisonous, though this last is denied by some authors. They are supposed to cure heart and intestinal diseases, fever and female disorders, diseases arising from fear, nose bleeding, tooth ache and they are also used as a vermifuge and as a remedy for goitre and skin diseases.

The recipe is as follows: roast the flesh, pouring wine over it, burn the skin and bones to ashes and mix them with warm wine. The scales are good to make a soup which is said to cure madness. The fat and liver are also used as medicines in different diseases.

The Chinese have a wonderful idea of the length of time an Alligator can live. Indeed they use it as a term of comparison for old age and if we say as old as Methuselah they write: (a friend of mine informed me) "older than the *T'o*" *pi t'o lao* 比鱷老. They also believe that this animal is gifted with greater strength and vitality than any of the known animals, the elephant included and as a Chinaman jocosely remarked to me: "if you foreigners give nine lives to the cat we must give at least twelve to the *T'o*."

### III.—FOREIGN LITERATURE.

HAVING now well-nigh exhausted the Chinese literature on the subject of the *T'o* and *Ngo* let us investigate what foreign books on China can say on the subject of Crocodiles or Alligators in this country.

Thanks to the kindness of the Jesuit Fathers who placed their valuable library at Sicawei at my entire disposal, and even provided me with written copies of the Great Imperial Encyclopedia quoted above, I was able to consult all the works written on China by their eminent predecessors at the Court of *Kang-Hi*.

The valuable collection of books on China found in the library of the North-China Branch of the Royal Asiatic Society was also carefully consulted.

It is curious enough to notice that out of such a considerable number of works written on this country four or five only, and those in the first part of the 17th century speak of the Crocodile or Alligator. And yet, after a careful comparison of the texts, they are found to copy each other so that the original sources of information are reduced to two, namely:—

Marco Polo the Venetian who writes in the 13th century, and evidently speaks from hearsay, and Father M. Martini who no doubt got his information from Chinese works.

I was much surprised to find nothing on this subject in Duhalde, Grosier, and others who seemed to have described everything worthy of note in the Empire. It was also in vain that we consulted, the more modern works on this country. Even those pretending to give the natural history of China are silent on the subject of crocodilians.

In Wells Williams' Middle Kingdom we find:—The larger lizards have not been noticed in China, though the Crocodile is found both in India and Siam on nearly the same latitude as Kuangtung. It may, however, have inhabited once the rivers of the Middle Kingdom, for the character *Ngoh* is evidently an original word, and Marco Polo describes a huge serpent which he had not seen himself, but which seems to have been intended for the Crocodile.

Here is the text of the Venetian traveller. Marco Polo (1280), Vol. II, p. 62 and seq., speaking of Province of Carajan, the actual province of Yunnan, says: "In this province are found snakes and great serpents of such vast size as to strike fear into those who see them, and so hideous that the very account of them must excite the wonder of those who hear it. I will tell you how long and big they are."

"You may be assured that some of them are ten paces in length, some are more and some less. And in bulk they are equal to a great cask, for the bigger ones are about ten palms in girth. They have two forelegs near the head, but for foot nothing but a claw like the claw of a hawk or that of a lion. The head is very big, and the eyes are bigger than a great loaf of bread. The mouth is large enough to swallow a whole man, and is garnished with great (pointed) teeth. And in short they are so fierce-looking and so hideously ugly, that every man and beast must stand in fear and trembling of them. There are also smaller ones such as of eight paces long, and of five, and of one pace only. The way in which they are caught is this: You must know that by day they live underground because of the great heat, and in the night they go out to feed and devour every animal they can catch. They go also to drink at the rivers and lakes and springs. And their weight is so great that when they travel in search of food or drink, as they do by night, the tail makes a great furrow in the soil as if a full ton of liquor had been dragged along. Now the hunters who go after them take them by a certain gyn which they



set in the track over which the serpent has past, knowing that the beast will come back the same way. They plant a stake deep in the ground and fix on the head of this a sharp blade of steel made like a razor or a lance-point, and then they cover the whole with sand so that the serpent cannot see it. Indeed the huntsmen plant several such stakes and blades on the track. On coming to the spot the beast strikes against the iron blade with such force that it enters his breast and rives him up to the navel, so that he dies on the spot (and the crows seeing the brute dead begin to caw, and then the huntsmen know that the serpent is dead and come in search of him.)"

"This then is the way these beasts are taken. Those who take them proceed to extract the gall from the inside, and this sells at a great price; for you must know it furnishes the material for a most precious medicine. Thus if a person is bitten by a mad dog, they give him but a small pennyweight of this medicine to drink, he is cured in a moment. Again if a woman is hard in labour they give her just such another dose and she is delivered at once. Yet again if one has any disease like the itch, or it may be worse, and applies a small quantity of this gall he shall speedily be cured. So you see why it sells at such a high price. They also sell the flesh of this serpent, for it is excellent eating, and the people are very fond of it. And when these serpents are very hungry, sometimes they will seek out the lairs of lions or bears or other large wild beasts and devour their cubs, without the sire and dam being able to prevent it. Indeed if they catch the big ones themselves they devour them too; they can make no resistance."

As Col. Yule remarks: "It cannot be doubted that Marco Polo's serpents here are crocodiles (or Alligators) in spite of his strange mistakes about their having only two feet and one claw on each, and his imperfect knowledge of their aquatic habits. He may have seen only a mutilated specimen. But there is no mistaking the hideous ferocity of the countenance, and the "eyes bigger than a fourpenny loaf" as Ramusio has it. Though the actual *eye* of the crocodile does not bear this comparison, the prominent *orbits* do, especially in the case of the *ghariyal* (gavial) of the Ganges, and form one of the most repulsive features of the reptiles' physiognomy...And there is some foundation for what our author says of the animals' habits, for the crocodile does some times frequent holes at a distance from water, of which a striking instance is within my own recollection (in which the deep furrowed track also was a notable circumstance.)"

"The Cochin-Chinese are very fond of crocodiles' flesh and there is or was a regular export of this dainty for their use from Camboja, I have known it eaten by certain classes in India. The term *serpent* is applied by many old writers to crocodiles and the like, *e.g.* by Odoric, and perhaps allusively by Shakspeare (*Where's my serpent of old Nile.*")

"Matthioli says the *gall of the crocodile surpasses all medicines* for the removal of pustules and the like from the eyes. Vincent of Beauvais mentions the same, besides many other medical uses of the reptiles' carcase, including a very unsavoury cosmetic."

For the French text of Marco Polo we consulted, "*Le livre de Marco Polo par M. G. Pauthier*, chapter cxviii, page 393." There we find in a note that Klaproth (in his "*Nouveau Journal Asiatique* Février 1828, page 118,") is of opinion that the animal in question is a boa, a kind of snake he says common in Yunnan. He ought to say a python, instead of a boa, as we have now at the Shanghai museum skins from this immense snake sent from Yunnan. But we think it more probable that the Venetian traveller mixes the python and Alligator in his somewhat obscure statements. H. Murray quoting Marco Polo in his *Historical and Descriptive Account of China* adds a few lines to explain that the animals in question are evidently *crocodiles*.

If we also compare the description of Marco Polo with those given by Bosc and Audubon of the Alligators of America, we will find many points of similarity. According to these authors, the Alligators, which are found as far north as the thirty-second degree of latitude, bury themselves in deep burrows, in the banks of the rivers where they pass the *whole of the cold season*, and even *the entire day in summer*. They fall into a lethargic state before the setting in of the frost and their sleep is so profound that they may be almost cut to pieces without manifesting any sign of life. They seldom travel except *during the night*. They can fast long, live on frogs, fish, aquatic birds, *on dogs, hogs, cattle, and any animal they can catch*. Slow on land they can move with great velocity in the water. Though usually met with on the edges of the rivers they are sometimes *also found in ponds in woods*. The Indians *eat the tail only*, and their eggs are prized by the natives, though they partake of the musky smell of the animal, which when strong is insupportable, but it is not perceptible when they are in the water. So disinclined are they to attack the human race that Mr. Audubon, and his companions have waded waist deep amongst

hundreds of them. They are caught with a strong hook baited with a bird or a small quadruped, and connected to a tree by a chain. They avoid the salt-water and proximity to the sea. When angry or fighting they swell themselves and utter a dull bellowing sound not unlike a blacksmith bellows. Stones or concretions are often found in their stomachs. They generally lay from fifty to sixty eggs which they deposit in the sand. In *Alligator palpebrosus*, the eyebrows form large knobs of the size of a man's fist (the great loaf of bread of Marco Polo).

After Marco Polo the oldest work in which we find a mention of the crocodiles in China is the *Atlas Sinensis* of M. Martini Amstelodam, 1656. In the description of the city of *Gucheu* of the province of *Quangsi* we find: "Ad urbis ortum est lacus parvus Go, in quo olim Rex *Pegao* decem aluit crocodilos, quibus, ut devorarentur objicere solebat reos et sceleratos; ab iis innocentes nunquam læsos fuisse narrant, adeo que, quos crocodili non occiderent, liberi eo ipso, tanquam vacantes omni culpa abire jubebantur."

That is to say: "At the entrance of the city there is a small lake called *Go* (crocodile lake) in which the King *Pegao* used to keep ten crocodiles. It was the custom to give them the accused people and the criminals to devour.

It is said that the innocent were never hurt by them, so that those who were not killed by the crocodiles were free from this very fact and ordered to go as if they were entirely innocent."

These saurians did not appear to be so good criminal judges in the province of Kuang-tung as the same author describing the city of Chingkiang (in the district of Chaochou) says:

"Ad ortum urbis *Ço* amnis est, quem incolunt crocodili etiam hic hominibus infesti." i.e. At the entrance of the city is (found) the river *Ço* inhabited by crocodiles, which are a great plague to the people.

In the description of the Province of Huquang, P. M. Martini speaking of the city of Siang Yang, says:

"Siang flumen ad urbis Barrolybicum est, in quo animal nascitur equo non absimile nisi quod squammosum sit, & unguis ut tigris habeat, ferox est, quod et homines et animalia cætera aggrediatur id præcipue autumnæ tempore tentat, quo frequentius ex aquis egressum terram pervagatur. (Novus Atlas Sinensis a Martini Martinio versus 1654. 7a. Provincia p. 76)."

This we find copied by Serlinus in a very curious old book printed at Francfort on the Mein (1165) and called "Artificia



*hominum miranda naturæ in Sina et Europa.* Willelmus Serlinus & Georgius Figwich. Caput XVI p. 1188. But as it was the custom at that time the authority is not quoted and the latin is cramped or badly copied. Leaving altogether the Barrolybicum he writes only Siang flumen alit animal, etc., and *ungues* is badly enough transformed in *angues* which has no meaning.

The following sentence of M. Martini: "At Chaocheu (Provincia Kuangtung) in amne Go incolunt crocodili etiam hic hominibus infesti" is also copied by Serlinus, but he puts *degunt* instead of *incolunt* thinking it probably a more elegant latin. This statement of Martini is confirmed on his map where we find the river Go flowing near Chao cheu.

Father Athanase Kircher, in his "China Illustrata, Amsteldam 1667," prefers to copy the description of these animals from Marco Polo.

Then comes the book "L'Ambassade de la Compagnie Orientale des Provinces Unies vers l'Empereur de la Chine, etc. . . . Leyde 1665." This is the description he gives, in quaint old French, of the Crocodile.

"On trouve aussi force *Crocodiles* près la ville de *Chao cheu* (province de Quantung) dans les eaux du fleuve de *Co* (Go?) les quels molestent et tiënt beaucoup de monde.(16) Cet animal a cinq choses fort considérables; il devient le plus grand du plus petit principe et commencement, *maximus existit ex minimo*, parce qu'il est produit d'un œuf; il remuë la maschoire d'en-haut ayant la basse immobile; il croît tout le temps de sa vie; il n'a point de langue selon plusieurs, ou l'a courte, ou inutile selon d'autres; et il fuit devant les personnes qui le poursuivent, ne courant qu'après celles qui témoignent de la peur en s'éloignant de luy. . . . On dit qu'il peut vivre quatre mois sans manger. . . . Les *brebis* et les hommes font ses plus friands morceaux. . . . On le prend avec des hameçons attachés au bout d'une corde fort déliée faite de *cannes*, en mettant quelque méchante brebis ou chèvre pour amorce que ces monstres avalent comme une pillule, et ainsi ils se trouvent attrapés.

"Les Chinois et les autres peuples Orientaux font bonne chère de leur chair qui est blanche, d'un gout de chapon et d'une odeur très agréable. Ils tiennent que l'eau, dans laquelle cette chair aura bouillie, a la force de guérir les morsures des araignées, et que leur sang éclaircit la veuë, et remédie aux

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(16) This is evidently taken from Martini.

blessures des couleuvres. Leur peau estant brulée et mêlée avec de la lie d'huile engourdit les membres de telle sorte qu'ils ne sentent point la pique."

This description is also accompanied with a curious engraving intended to represent a crocodile, but it is evidently drawn a great deal more from imagination than from nature. The body which is covered with oval scales, very distant from each other, does not rest on the ground and the tail has only one ridge of scales instead of two.

From these times 1280 and 1667 we find no books mentioning the existence of the crocodiles in China except Williams in his *Middle Kingdom* as above quoted and Morrison who says positively in his dictionary that crocodiles are found in Yang-tsze-kiang. We have searched carefully the old files of the Shanghai newspapers and it was not until the year 1869 that we found the first reliable modern notice on the existence of crocodiles in China.

Under the title *Crocodiles in China*, the *Shanghai Evening Courier* of the 17th of March 1869 gives the following:—

"A little time ago, before the rise in opium and the feverish but profitable speculation in rags to arrive, engrossed the active foreign mind of Shanghai, we were interested in a report that a real true dragon had been imported and was to be seen by the curious in the Shanghai tea gardens. Naturally reports magnified the appearance and attributes of this extraordinary creature; nothing of the kind had been seen before; it had come out of a cave in the wild *Kiangse* mountains; could devour a child without distressing its thorax; and was eminently calculated to perform that supreme act of Chinese patriotism: exterminate the barbarian. A goodly crowd of foreigners went to see the monster. Armed with ten cent pieces or whatever small coins the ingenuity of bank compradores induces us to accept as quarter dollars, and unmindful of sundry bad cases of confluent small-pox and other forms of infectious disease with which the entrance to the Chung wang miao (17) is ornamented, we found ourselves amidst the wonders of that most curious ground known as the tea gardens. Passing through the festive crowd who were spending their loose cash with mountebanks, peep shows, story tellers, and sweetmeat vendors, we came upon a large space surrounded by a strong net in the middle of which was a canvas screen about two feet in length, and behind this was concealed the dragon. A notice at the entrance informed the public that he weighed so

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(17) Temple of Chung Wang.

many catties and was a real horrible mountain dragon. Above the canvas screen could be seen the manly form of a coolie armed with a bamboo, who every five minutes appeared to be engaged in a kind of Pootung outrage (fight) with the monster within, and every five minutes by the gesticulations and cries of this gentleman it would appear that the dragon had got the better of his antagonist, who disappeared defeated behind the canvas for a time before recommencing the performance. Truly there must be a "pucka" (proper) demon inside! so feeling the attendant, in we went, with a fore knowledge that we were going to be "done" and "done" we were. In an ordinary washing tub about three feet long was to be seen a poor miserable half dead common Crocodile, or Alligator as learned discriminators of species declare it, who resembled his congener of the Nile about as much as a monkey does a man. He had a curious despairing look in his wicked little eye and seemed to be thinking of that feed of fish which he sadly wanted, but would never get. The attendant, he of the bamboo lately engaged in the terrific struggle, took the wretched thing from his tub, turned him upside down, opened his mouth in the gentle way a parish doctor does a pauper's, shewed his teeth, and with a broad grin informed us that he was very terrific. Then the poor beast was returned to his wash tub and instantly went into a stupor! It had most likely come up in a ship from Siam, the crew of which forgot to feed it, and was not comparable as an object of interest to our late friend the salamander. That brute at all events redeemed a long life of the most uncompromising indolence, by turning sharp round on his master and biting his hand severely causing him at once to respect his captive and be more careful in future. The party assembled, among whom were the learned both in law, language, medicine and science felt that they had come a long way to see nothing, but to console themselves, agreed that this wretched little crocodile having thirty-two teeth must be a new species, and that consequently both time and coin were well spent."

This is the first mention of a *probable new kind* of Alligator or crocodile in China and though the article was written in jest some of the scientific men who were with the writer (Mr. Goodwin, an able scholar and great ægyptologue) declared from their cursory investigation that this was a new species as we will see later on by Mr. Swinhoe's note in the Proceedings of the Zoological Society.

This paper was written and going to the press when hearing that Mr. E. A. Reynolds had seen Alligators in the Yang-



tsze long before that I enquired from him on the subject, and he very kindly favoured me with the following note:—

"In April 1858, I lent my house-boat to T. T. Meadows, H.B.M.'s Consul, and accompanied him in her to Nanking, where we were towed by H.M.'s steamer *Hermes*, having on board Sir Sam. Geo. Bonham, Governor of Hongkong. On approaching Silver Island, we noticed what appeared to be human bodies floating near the shore in the eddy tide; but on nearing there were found to be wooden idols, which the rebels had thrown into the river from the joss-houses on the Island. Not seeing anyone moving about Meadows and myself proceeded in my boat and landed. We found all the pavilion, priests' dwellings, etc., burnt down; but all the temples at the landing were perfect. I found one priest, to whom I asked, if there were no small josses about, he took me to a ditch into which a number of brass, bronze, and other metal idols had been thrown. I carried away quite a number. He took me to a pond or a small lake, taking a small bowl of rice and a switch with him, with the latter he beat the water crying 'ado, ado,' presently an Alligator or Crocodile came towards here we were standing, and while still in the water opened his mouth into which the priest threw the contents of the bowl: the Alligator backing himself into the water again. I was quite unprepared for such a sight, and was a little alarmed at first. I should say the animal was of a good size, but as his open mouth only came out of the water, I could not see how long it really was."

"Returning to the temple, I noticed a very fine etching, of an Alligator, also a long inscription cut in the slate tablet, I dug this out intending to bring it away, but on getting it to the ground it was found it would require several men to carry it off, so I had to abandon it. I, however, think it would have been replaced by the priests, and may be now in the wall, from whence I removed it. I should think one could get a full description of this Alligator from the inscription.

"The officers of the *Hermes*, who landed shortly after were much struck with the correctness of the etching, being a departure from Chinese rude pictures of all animals. Doubtless this correctness may be attributable to the fact of the priests having daily opportunities of watching their pet when basking in the sun.

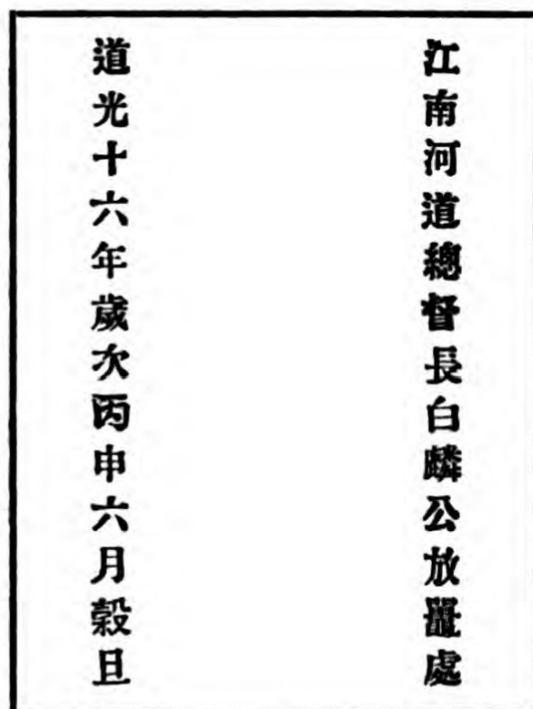
"A friend of mine, Captain Elsworthy, who was in the Taoutai's fleet blockading the river, told me he had frequently been shewn this same Alligator by the priest some months after; and they told him it went away in the winter (more likely only

buried itself deep in the mud at the bottom of the pond), and returned in the spring and remained on the Island during the hot months.

"I since made enquiries about this Alligator, and was told that one of the captains of a Portuguese lorch, employed also in blockading the river, had fired at it with his rifle while the animal was in the pond; but whether he killed it or not, I did not learn; probably not, or else, we would have heard more of it.

"Three years ago (1876), while ascending the Yangtze in my steamer, being some miles below Nanking, my people were alarmed at a strange to them looking fish, which was close to the shore not more than ten feet from the steamer. I immediately ran to the side, and then saw an Alligator about eight feet long floundering in the wash caused by the paddle-wheels. I stopped the steamer with the view of capturing it, but it had disappeared. I am led to believe this same Alligator was since seen at Chinkiang, no doubt having drifted down by the current."

Highly interested by this communication I took the earliest opportunity of repairing to Chinkiang, and on the 2nd of January 1879 I found in the *Hai Shen Miao*, Temple of the Spirit of the Sea, at the eastern extremity of Silver Island, the tablet in question. It is a heavy marble slab, six feet, in height by two in breadth, standing against a wall and bearing in two vertical lines the following inscription:—





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That is to say: "*Lin of Chang Pai*, (18) Governor-General of the Yellow River of Kiangnan released the Alligator at this place on a lucky day of the 6th moon of the 16th year of *Tao-Kuang* (July 1836). Below the inscription is a very good engraving of the *T'o* Alligator, of which the accompanying wood-cut is a reduced facsimile. It was obtained by a direct impression or rubbing (19) made on the stone. A little further on I saw the pond in which a living Alligator is still kept; this specimen has been there for two years. But as it was lying torpid in the mud at the bottom I was unable to catch a glimpse of it.

From the priests I heard that these saurians are often found in the Yangtsze by the native fishermen in whose nets they become entangled. As they are no use to them they are killed by blows on the head and their carcasses are thrown back into the stream. Sometimes however they are presented to or purchased by the priests of the *Hai Shen Miao*, where for years past one at least has been kept in the pond. According to my informants at Chinkiang these Alligators come from the Tung Ting and Po Yang lakes being driven in the swift stream of the Yangtsze at flood times.

From the above inscription we understand that the Alligator released from captivity by *Lin* was probably the first seen there. It is a common practice amongst Buddhists to buy living animals and set them at liberty. This is held as a very

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(18) There were formerly two high functionaries superintending the course of the Yellow River, one for the southern course in the old province of Kiangnan (now Nganhui and Kiangsu) and one for the northern course in the province of Shantung; thence the two names of *Kiang Nan Ho Tao Tsung Tu* 江南河道總督 and *Tung Ho Tao Tsung Tu* 東河道總督. (*Ho* 河 is often employed in Chinese language as meaning the river *par excellence* the 黃河 Yellow River).

*Chang Pai* 長白 stands for *Chang Pai Shan*, the name of a celebrated mountain in the north-east of Manchuria, not far from the northern frontier of Corea. Here it must be translated by the adjective Manchurian, as it appears that the whole of Manchuria is often designated by the name of the mountain, a practice often resorted to in Chinese literature.

The governor general *Lin* of Manchuria must have been the last but one of the functionaries in charge of the meridional course of the Yellow River, as this charge has been since abolished, most probably on account of the change of direction which took place in the course of this river in 1851. (For this information I am indebted to the kindness of my friend Mr. J. de Bielke, interpreter of the French Consulate.)

(19) To obtain those rubbings a thin paper slightly wet is applied on the stone and pressed into the cuts, a cake of black wax is then rubbed upon it and the characters on drawings appear in white on a black ground.

meritorious act and according to one of the Buddhistic rules its value is enhanced by the comparative rarity of the animal.

On the Yangtze, this ceremony, called *Fang-sheng* releasing the living, is often resorted to in order to propitiate the god of the waters. Turtles are often bought for this purpose and liberated in the great river with a small piece of metal, fastened to the shell, bearing the date with the name of the pious performer.

In the case of the *T'ao*, the Governor-General of the Yellow River wanted evidently to commemorate the event of releasing such a rare animal which he most likely had seen then for the first time; accordingly he chose a lucky day for this performance and caused the commemorative tablet to be erected.

It now stands under the guardianship of some Hunan braves as a part of the temple has been transformed into a fortress, foreign guns having taken the place of the wooden images which floated down the river in 1858 to the great amusement of the rebels.

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#### IV.—NATURAL HISTORY.

If we now consult the modern scientific works written on the Natural History of China, still very few, we find that no scientific traveller, nor naturalist has found the crocodile or Alligator in this country. In the *Expédition du Meikong* which crossed Yunnan, I expected to find something on this subject, but was sorely disappointed. The Abbé David confines himself to geology and birds describing also some new kinds of Mammalia, but of crocodiles he does not even mention the name. The *Novara Expedition* round the globe which mentions some of the Shanghai new birds did not go far enough into the interior. Baron von Richtoffen confines himself to geology. The Jesuit naturalist, Father Heudes, has made a name for himself in the conchology of China, but it is curious enough that in dredging for shells in the rivers of Chinkiang and Ningko fu districts he never came upon an Alligator, though, he tells me, he has often heard of the existence of what he calls crocodiles in these districts, where, he says, the natives use them for medicine. Once he lost a good opportunity through the saving propensities of his servants, who refused to buy a skin of this animal because the merchant wanted a few hundred cash more than they thought proper to give.

Thinking that some navy doctor, a temporary resident in China, might have per chance discovered these animals and reported upon them, I searched the Proceedings of or the Zoological Society of London and the *Nouvelles Annales du Museum de Paris*. I found some new species of crocodiles described in the former, but none were of China. At last, I came upon a list of Reptilians and Batrachians collected in various parts of China by the late Mr. Swinhoe and with great interest read the following :—

“No. 3.—*Crocodilus* sp. ?

“In February, 1869, some Chinese were exhibiting, in the native city of Shanghai, what they called a dragon, which they declared had been dug out of a hole in the province of Shense (Mr. Goodwin puts Kiangse). It was a young crocodile about four feet long, which they kept in tepid water. They made so much money by showing it that they refused to sell it. *I cannot, of course, guess at its species ; but I, nevertheless, think the fact worth recording, as evidence that a species of this group does occur in China.*”

Having heard that some two or three years ago a crocodile had been seen in Chinkiang, I asked our President, Mr. T. W. Kingsmill, to write to the person who had seen it for information and this is the reply of Mr. T. W. Duff :—

“In 1875 there was an Alligator caught in the Yangtsze, off the British Concession at Chinkiang, but well out in midstream. It was not particularly lively, although summer time, but this may have arisen from the rough handling it got while being caught. No one could account for its presence in the river, although it was surmised that it might have escaped from some temple ; but as there are few of these places near Chinkiang at all likely to have such an animal in them, I do not think it at all reasonable.

“It lived some days in a pond until a deputation of Chinese purchased it for fifteen dollars and presented it to the priests on Silver Island. Whether it lived there or what became of it after this I am unable to say.”

Having failed to procure it for the Shanghai Museum an Australian Crocodile brought from Australia to Chinkiang in 1868 by the celebrated entomologist, Dr. Martin (who died in America this year), was sent instead to the Museum, where it was gazed at, for a few years, as a Chinese crocodile until the perpetrator good naturedly confessed his joke.

Nothing more was heard of the crocodiles until April this



year, when a member of the Chinese Customs service, Mr. Lloyd E. Palm, Acting Deputy Commissioner at Wuhu, bought from the natives, a specimen which had been apparently dug from the ground in the neighbourhood. When it reached us on the 15th of April, it was still in its torpid state, and could be handled easily without danger. Having no books of reference in the Shanghai Museum, I took the animal with me to the Jesuits' Museum at Sicawei, and there with the assistance of the curator, Father C. Rathouis, M.D., of Paris, studied and dissected the animal comparing it carefully with the plates of Cuvier, Duméril and other works on reptiles, especially those of India. The skin was then prepared and mounted by our native taxidermist of the Shanghai Museum where it can now be seen. From this study we came to the conclusion that it was probably a new species of Alligator, and I took care to state the fact in the *North-China Daily News* of the ninth of May, (20) when acknowledging the contributions of the preceding month. I added a few words asking for another specimen to be forwarded to Paris, in order to have this species named.

This appeal was duly responded to on the 3rd of October last, when we received a second specimen from Chinkiang. It appears that it had been seen coming down the stream in a half torpid or exhausted state, and some Chinese fished it up just opposite the Custom House.

The capture, made without difficulty, was witnessed by the two Customs employés, Messrs. C. W. de Ste. Croix and J. C. Günther, who conjointly bought it on the spot and presented it to the Shanghai Museum, where it arrived on the 4th of October, and where it is still alive in a state of lethargy having only eaten twice since its arrival. (21)

I now had well-substantiated cases before me. In the first some of the mud in which the Alligator had been buried could

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(20) The museum has also received two new and important specimens:—A beautiful Albatross (*Diomedea Derogata?*), shot by Capt. A. Croad near the Chusan Group; and a living Alligator (*Alligator Lucius?*) sent by Mr. J. L. E. Palm from Wuhu, where it was captured in the hills. Père Heudes having also seen Alligators near Ning-ko-fu, there is no more doubt about the existence of this saurian in the Yangtze waters. It differs considerably from the two species described in Cuvier and Duméril, and will likely prove a new variety. If any friend of science can succeed in sending us another live specimen, it will be forwarded to Paris for examination.

A. A. FAUVEL, *Hony. Curator.*

(21) It died on the 24th of December, apparently from aneurism of the heart, as the pericardium was found full of blood. It was an adult female, with sixteen unmaturing eggs in the ovaries.

be still found in the mouth and anal aperture, so it must have been found not far from Wuhu, and the capture of the second specimen in the Yangtze waters proves that these two Alligators were natives of China. About September I saw two live specimens, which Dr. O. F. von Möllendorf, the interpreter of the German Consulate at Tientsin, had bought in the Chinese city of Shanghai for the sum of ten dollars a piece. The weather being then warm, they were very lively and rather dangerous to handle, uttering, when approached their characteristic bellowing sound. The natives who sold them said they had come from the Poyang lake where they were to be found in numbers.

Upon inquiry I soon learned that some had been shown from time to time in the native city, and Dr. Little told me he saw two in Chefoo this summer, where they were exhibited as a great curiosity. They measured about five feet in length. Finally, I myself lately procured in the Chinese city of Shanghai, a skin with the complete skull attached.

One was also procured in the same place by Mr. Löczy, the geologist of the Austro-Hungarian scientific mission. I was then able to study the generic characters from four good specimens and from this study I came to the conclusion that we were in the presence of a real Alligator of a new species or at least not described in Cuvier, Duméril, Bibron or other authors I could consult. Unhappily as I was unable to find here the last work of Professor Vogt of Geneva on the crocodilians I cannot be quite sure that this species has not been found elsewhere.

However the article on Alligators in the very last edition of the Encyclopedia Britannica clearly states that all the species of Alligators known are found in America and with one exception only (The *A. Lucius* found up to the 32° lat. in the Mississippi) are confined to its tropical parts Brazil, Guyannas, etc.

Cuvier, says the same Encyclopedia in a former edition thinks it most probable that Alligators have their representatives in our hemisphere although it does not seem to be yet ascertained whether any true Caïmans are found in the old world. This is perhaps a little far fetched as the words of Cuvier are "Il serait possible que l'on découvrit par la suite dans l'ancien continent quelque espèce appartenant à la subdivision des Caïmans."

It is probably with still less accuracy that the same edition of the Encyclopedia says, speaking of *Crocodylus Biporcatus* the same as *C. Porosus*: "This species is the common croco-

dile of India and its archipelago, frequenting the Ganges and other great rivers which empty themselves into the ocean, as also those of Corea (?) and China (?), Ceylon, Java, Timor, etc."

Upon what authority this statement is based the Encyclopedia Britannica does not say. Though real crocodiles may be one day found in Southern China I have great doubt about the possibility of their being discovered in cold Corea. At all events I never saw this last country mentioned for its crocodiles elsewhere.

Thinking that our Alligator might have its representative in Annam and Cochin-China I went to see some of our French missionaries who had lived many years in these countries and from their descriptions made sure that the crocodilians found there are the *Crocodylus Siamensis* *C. Porosus* and the gavial of India. They saw our specimens in the Museum and declared them entirely new to them. I insist upon this point, because of the crocodiles in Saigon being called caïmans, a name which belongs only to the Alligator.

The flesh of the Alligator does not now seem to be eaten in China as that of the crocodiles is in Annam, but its skin is found in medicine shops where it is often used in place of a sign board. Two were procured in the native city of Shanghai and the natives who sold them told us they came from Canton. All the natives here called these skins sea dragons' skins *Hai Lung p'i*, and seemed considerably astonished when I told them that the Alligator was never found in the sea. In other districts, Chinkiang and Wuhu, the name for it is *Ngo Yü* or *T'u Lung*, *Ngo* fish or earth dragon.

With this I shall close my disquisition on the history of the Alligator and shall now proceed to the description of the animal.

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## V.—DESCRIPTION OF THE ALLIGATOR.

As a great many people easily confound the Alligator with the Crocodile we will give first the generic characteristics of the two from Cuvier's book. "Les Ossements Fossiles." 1.—CROCODILE. Muzzle oblong; the upper jaw has a notch on each side to allow the fourth tooth of the lower jaw to pass, the hind feet are fully webbed and fringed or denticulated on the outer margin. The teeth are at least 15 on each side in the lower jaw and 19 in the upper one. The first ones of the



inferior jaw perforate the upper one at a certain age and the nuchal plates as well as the dorsal differ greatly in number, shape and position from those of the Alligator. The post-orbital holes are very large and always present.

2.—CAIMAN OR ALLIGATOR (the names are synonyms. Caiman being the one given by the negroes in America to the *A. Lucius*.) The muzzle is broad and short. The superior jaw receives the fourth tooth of the lower jaw in a particular hole or foramen which conceals it entirely; the hind feet are only semi-palmated and do not possess the fringe or denticulations.

The length of the head is to its breadth as two to one. The teeth are very unequal in length and there are at least 19 and sometimes as many as 22 on each side of the lower jaw; at least 19 and often 20 on each side of the upper jaw. The post-orbital holes, in the species which possess them, are very small, in one species they are entirely absent. There are about 6 species of Alligators known. Cuvier describes three with one variety viz: *Alligator Lucius*, *A. Sclerops*, *A. Palpebrosus* 1st variety and 2nd variety. Since Cuvier's book was written two more have been added to the list: *A. Cynocephalus* and *A. Nigropunctatus*.

I will now compare the Chinese Alligator carefully with the five described by Cuvier and with the two others as described by Duméril and Bibron.

At first glance it looks very much like the *A. Lucius*, the pike-muzzled Alligator. Its head and muzzle are flat, the sides nearly parallel and uniting in front in a parabolical curve. The internal edges of the orbits are slightly elevated. The nasal aperture is, even in the young, divided in two by a bony bridge. A small hole in the bones of the palate corresponds to the nasal aperture but it is covered by skin in the living animal.

All these characteristics also belong to the pike-headed Alligator but it differs in this way that the snout of the *Lucius* is comparatively longer. Its length is as 1 and  $\frac{1}{4}$  to its breadth taken in front of the orbits. The total length of the cranium (taken from the base of the skull to the point of the snout) is as 2 and  $\frac{1}{4}$  to its breadth taken at the same place. In our Chinese Alligator, the length of the snout is nearly equal to its breadth and the length of the cranium is a little less than twice the extent of the snout, so that the head forms an isosceles triangle shorter than the one figured by the head of the *Lucius*.

A greater difference exists in the appearance of the bones which are deeply honey-combed or vermiculated in ours and

smooth in the other, whose snout is also more flat. Other differences exist in the shape and direction of the post-orbital holes. Their external aperture is ovalo-elliptical with the great axis sensibly parallel to the axis of the skull; in the *Lucius* they are smaller, the perforation being a small one at the bottom of an elliptical *fossa* whose great diameter forms an angle with the axis of the head; the aperture of the angle being in front towards the snout.

The vermiculated appearance of the bones is also possessed by the *crania* of the *A. Sclerops* and *A. Palpebrosus*, but the shape of the head is far different and the post-orbital holes very small in the first are altogether absent in the second.

Nor does it possess the characteristic crest between the orbits which gives its name to the *Sclerops*, *i.e.* spectacled.

But it is very curious to notice that however different the shape of the head from the *Palpebrosus* it possesses like it the bony eyelids from which the specific name is derived.

The teeth formula of the Alligators is from 19 to 22 on each side of each jaw (the one for the *Sclerops* is  $\frac{19.19}{21.21} = 80$ , as well as for the *Palpebrosus*). In our specimens I find  $\frac{18.18}{19.19} = 74$ , so it has fewer teeth than any species but the *Lucius*, whose formula is  $\frac{18.18}{17.17} = 70$ .

Thus by the shape of the head, the weavy edges of the snout, the bony bridge of the *nares* (possessed by no other species than the *Lucius*), and by the post-orbital holes it is nearly allied to the Pike-headed Alligator. By the honey-combed appearance of the bones of the skull and the bony eyelids it approaches the *A. Palpebrosus*.

By the shape, form and number of the teeth it differs from all as well as by the size and general dimensions of the different parts of the body.

But those are not the only specific characters of the Alligators and we must now look to the disposition, form and number of the nuchal and dorsal plates, and also compare the dimensions of the various species.

The nuchal plates of the *Lucius* are 8 in number, oval-shaped and distant from each other, disposed in 4 rows of 2 each. In the *Sclerops* there are 14 square plates, disposed in five rows and close to each other, being 2 in the 1st, 4th and 5th rows and 4 in the two others. In the *Palpebrosus* we count 10 plates in rows of 2 close to each other, they are separated from the skull by a line of 4 plates of good size and distant from each other. The disposition of the nuchal plates in the *A. Palpe-*



*brosus* 1st variety is very nearly the same as the one found in our specimens when we see six conspicuous nuchal plates closely packed in three rows with a short space of separation from the plates of the back not found in the other species. Two small round isolated plates are found in front of the nuchal shield and between them and the skull is a semi-circular row of six conical plates. These characteristics I have found constant in the six specimens I have been able to study and constitute by themselves a new species.

The number of the rows of dorsal plates is 17 from the shoulders to the base of the tail, they correspond exactly to the number of vertebræ. They are disposed as follows:—

$$\begin{array}{r}
 8 \text{ rows of } 4 \text{ plates} \\
 7 \quad " \quad " \quad 6 \quad " \\
 7 \quad " \quad " \quad 4 \quad " \\
 \hline
 17
 \end{array}$$

In the other species I find the number of rows varying from 18 to 19. The number of the plates in each row is also at variance with the number of those in our specimens. The difference is still more perceptible in the number of the single or double crested bands of the tail.

The length of our adult Alligator is about 5 feet and 8 inches whilst the *Lucius* measures 6 or 7 feet, some go even to 14. (The head is included about 8 times in the length of the body of the Chinese Alligator).

The *Sclerops* measures from 11 to 14 feet (8 heads  $\frac{1}{2}$ .) The other species measure from 6 to 9 feet. So our Chinese Alligator seems to be the smallest of all known.

Its colour above is a greenish black, speckled with yellow vermiculated lines only apparent when wet. The underparts are of a greyish colour, on the tail bands of faint yellow and green are visible.

This colouration is also peculiar to the Chinese Alligator. The colour in the other species being: a deep greenish brown above and a white tinged with green in the *Lucius*; or a blueish green above and an irregularly marbled green and yellow below in the *Sclerops*. In both the *A. Cynocephalus* and *A. Nigro-punctatus* the back is greenish with black spots. The hind feet of our specimens are very slightly palmated as may be seen by the plate. In this it resembles *A. Palpebrosus*, the least palmated of all.

In conclusion I find that the Alligator of China differs great-

ly from all the described species; at least from all those described in Cuvier, Duméril, Bibron, etc. Its position appears to be between the *A. Lucius* and the *A. Palpebrosus*, so until it has been more carefully studied at home, we propose for it the distinctive name of *Alligator Sinensis* and append herewith the final description of it as a base for further and more complete study.

#### ALLIGATOR SINENSIS.

*Distinctive qualities and habits drawn from six specimens, of which one is a male and one female.*

The Chinese Alligator appears to be a small species measuring from 1.45 to 1.74 metre; though longer specimens may still be found.

*General Dimensions.*—In the largest specimen studied the measurements are as follows:—

Length of the head (from the snout to the articulation of the jaws) ..	0m. 240
Breadth of the head at the same place .....	0m. 135
Breadth of the head in front of the eyes .....	0m. 115
Body from base of cranium to the beginning of the tail .....	0m. 638
Length of the tail .....	0m. 863

Total length....1m. 741

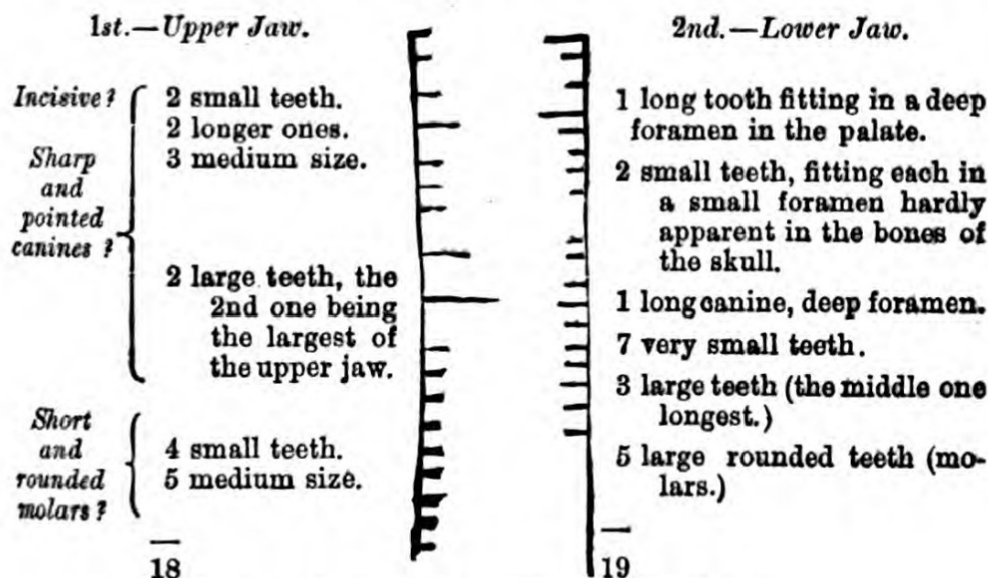
The length of the head is contained about 8 times in the length of the body, and it is double its breadth in front of the orbits.

The measurement round the middle of the body gives 50 centimètres.

The edges of the snout, which is short and slightly concave are very weavy, a great deal more so than in the *Lucius*. It seems a little broader in the male than in the female.

*Teeth.*—The formula of the teeth is  $\frac{18.18}{19.19} = 74$  with sometime a small difference of one or two teeth in either of the jaws. It seems also to change with age as in a young specimen we found the formula to be  $\frac{17.17}{18.19} = 71$ .

These teeth vary much in size. They are, with the exception of the back ones (molars!) sharp pointed with a slight curvature directed inwards. Being symmetrically disposed we will give their respective number and disposition only for half of each jaw, beginning from the snout:—



All of them overlap those of the lower jaw.

There seem to be at least three generations of teeth, as in the oldest specimen I found smaller teeth always present within the others.

*Cranium.*—As may be seen from the annexed plate the skull presents the general appearance of an isosceles triangle whose base measured at the articulation of the jaws is contained 1.7 in the length; otherwise the head is very nearly twice its breadth.

Dimensions of the cranium: length from base to snout. The base taken on the line of articulation of the jaws .....	0m. 234
Breadth at base .....	0m. 147
Breadth in the middle, just in front of the orbits	0m. 105
Length of snout from this place .....	0m. 117
Height of the head at the thicker place (behind the eyes) including lower jaw .....	0m. 105
Total length of the head including the lower jaw	0m. 264

The sides of the snout are nearly parallel to the axis of the cranium, they are joined in front by a parabolical curve beginning at the upper canine tooth at which place it is much enlarged. The snout is concave being enlarged at the nares.

*Nares.*—The nares are separated from each other not by a bony septum as in the *Lucius*, but simply by a bony bridge. The ridge is slightly elevated and the shape of the opening in the bones of the snout is quite semicircular.

*Bones of the Skull.*—The bones of the cranium are deeply

honey-combed or vermiculated, in some places perforated as around the margin of the palate in which there is a small opening immediately under the nares, but it is covered by skin in the living animal.(22) There are two large bow-shaped openings in the back of the palate just under the eyes, they are also covered by the skin of the palate; they measure five centimètres in length and one and a quarter in their greatest width.

*Eyes.*—The orbits are very near each other, the distance between them being only one centimètre, the inner edges are slightly elevated and there is a marked depression in front of nine millimètres deep, where the ridges slope down on the snout. In the thickness of the upper eyelid are lodged one or two thick bony plates irregular in shape.

*Ears.*—The tympanum of the ear is simply covered by a thick flap of skin which closes more or less upon it; there is no external vestibulum.

*Post Orbital Holes.*—They are very apparent ovalo-elliptical in shape and can be felt even through the skin. They are situated immediately behind the orbits and in the same line with them. This line which passes through them according to their grand axis is parallel to the axis of the skull and also passes through the middle of the nasal aperture, so that the post-orbital holes, the bony eyelids and the nares are situated on two lines parallel to each other and to the axis of the cranium.

The line forming the basis of the skull is slightly convex towards the body with a very small notch in the middle.

Under the lower jaw near the throat there is on each side a tubular gland containing a musky substance, when the animal is angry these are projected outwards by a kind of telescopic motion like two horns or tubes about two centimètres in length.

The Chinese Alligator appears very slow in his movements being nearly always in a half torpid state, in the summer time when molested he is inclined to bite but is never first in the attack. For the general colouration of the body see above page 83 and page 82 for the disposition of the nuchal and dorsal plates.

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(22) Not always present.

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After this paper had been printed I found some curious notes about the Alligators in different works and received further valuable information of which the following are the most important items :—

### I.—PHILOLOGY AND CHINESE RECORDS.

In the *China Review* of March and April 1879, Vol. VII No. 5 I read among the notes and queries : CROCODILES. 起蛟 “Raise the Crocodile” means “deluges” or “disastrous floods.” The question as to what the 蛟 really is has already been discussed of recent date both in this journal and elsewhere. The watery phenomena known as “crocodiles” are said to occur only in the interior Provinces, and to be especially frequent in Honan. The “crocodile” takes several years to incubate, and during this period lies concealed deeply in a gently undulating mound, which is never covered with snow. If, therefore, it is observed that any given spot is not covered with snow when the rest of the ground is covered, notice is taken of the fact, and persons are sent annually to make examination of the spot, and observe if the absence of snow is repeated. If the spot be uncovered during three successive years, the “crocodile” is unmistakably there, and must be dug out. At a great expenditure of time and labour this is accordingly done, and the animal (whose appearance as described answers to that of a small Alligator) is carefully conveyed to the sea. If he is not dug out, when he himself comes forth and “rages,” he speeds like a blight all over the land, cutting through every obstacle, and carrying behind him a huge “tidal ware.” All this too in the interior !”

This may explain why the natives made such a demonstration at the finding of an Alligator underground some time ago near Chinkiang. The event was commemorated by a small article in one of our local Chinese newspapers, the *Shen Pao* 申報 and the following is the translation published by the *Shanghai Courier* of the 11th March, 1879 :—

“A short time ago, a party of workmen were engaged in clearing out a small canal close to Chinkiang, when they came upon an Alligator which had buried itself in the mud, its scales being distinctly visible. They immediately stopped work and reported the matter to the authorities. The mandarins came down to the place in a body and burnt incense to the beast, in the hopes of inducing it to go, which, however, it refused to do. A large number of people came over from Yang-chow to see

the creature. Its appearance is said to presage a great rise in the river this year."

In March 1879 I also found a notice of the T'o in a beautifully printed and illustrated Chinese work called: 鴻雪因緣圖記 *Hung-hsüeh-yin-yuan-tu-chi*, written by Lin, of Chang Pai. This book (2nd edition) was published in the city of *Yang-chou* of the province of *Kiangnan* in 1849 and is the best illustrated Chinese book I know. The work is in six volumes of about one hundred pages each and having a fine double page engraving after every two pages of printed matter. These two pages are an explanation of the picture. In the second volume of this beautiful work we find a picture of Silver Island at Chinkiang of which the opposite wood engraving is a facsimile. The picture and explanatory notes are headed: 焦山放鼉 *Chiao shan fang t'o*, that is: The release of the Alligator at *Chiao-shan*.

After giving the exact position of the Island, explaining its name, etc., the author describes the temples and nunneries—found there, and mentions the name of the great writer of the Ming dynasty who traced the four large characters 海不揚波 now deeply graven on marble slabs at the entrance of the main temple.

Now he comes to the subject and says: When first I received a government appointment, and had to leave the city of Chinkiang, I saw in the neighbourhood, some distance off, a man standing at the door of a tent, beating a drum to attract the attention of the crowd, and inviting the people to come in and admire an extraordinary object. I sent one of my military officers to see what it was and report to me. He returned with a picture of an animal, which I recognised to be the T'o. I immediately bought this Alligator for ten taels of silver and conveyed it to Chiao-shan in my assistant's boat. Later on, (at leisure) I gave orders to have it set at liberty in the great River (the Yang-Tsze-Kiang). But as the animal was continually returning to the Island, I had it placed in the pond called 放生池 *Fang sheng chih*; that is:—Pond for the liberation of animals. It seemed delighted with its new place and disappeared (in the mud). I then composed a piece of poetry in its honour and showed it to the Abbot of the monastery. It runs as follows:—

In the vast seas was once an old Alligator. It possessed a square head and four feet like a dragon. Its back was marked like that of an immense tortoise. This animal was evidently of the dragon family. It could fly through the air, the clouds, the mists and fogs. Alas, by an accident it lost its liberty, and

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AVAILABLE**





became the laughing stock of a little child. Being moved with pity at its miserable condition, I bought it for a thousand cash. I was then making a tour on the great Yang-Tsze-Kiang. Still, I took it with me to the place called *Kua pu*. On the Golden Mountain stands an old monastery, whose numerous buildings and ornamented temples are rendered famous by the tomb of *Tu pu*. Knowing well for a fact, as old records will prove, that the spirit of the brute was that of *King tu*, I resolved at once to have it set at liberty, on the very tomb of the great man whose spirit it possessed. Badly directed, I could not find the place, so I took it with me to the Island of *Chiao shan*, where I deposited it in the midst of the waves. The animal looked at first much pleased and happy; but soon turning its head it swam back to the jetty, now gliding on the waves, now swimming with great vigour. Having placed it again in a small and light boat, I reached the Elephant Hill, on the opposite shore, where I placed it once more in the midst of the waters. From the very moment of its new liberation, towards the Silver Island it directed its way. Some one said that it had been probably weakened and that it could not contend with the mighty stream. Another one explained that the spirit of the man, with which it was possessed, was evidently anxious to go and rest on the hill of the sacred spirits. Although the Buddhist priests pretend to know all things, the head of all of them, the wise and old Abbot could not account for it or give an explanation. I had the brute placed in the pond of liberation, where it soon found shelter in the muddy bottom, feeling happy and at home I have not a doubt. This charitable deed, I performed with great hope of bringing good luck to my future career. And another song was made, rhyming with mine, by two of the Buddhist priests of the sacred shrine. Two learned students from two different places wrote also a long memorial telling of the circumstances. Four other *litterati* from four distinct cities engraved a perfect picture of the Alligator on a large stone tablet on which they also wrote that Mr. *Lin* of *Chang pai* set free the Alligator at this place. This monument can be seen on the bank of the pond.

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## II.—FOREIGN LITERATURE.

Having also heard from my friend Doctor Bretschneider of Peking that a mention of Caimans as existing in Corea was

made in an old book called "*Histoire des naufrages*," I searched for it in the libraries at my disposal. I found that a certain Dutchman by name H. Hamel von Gorcum had written a book on Corea under the title :

"*Journael van de ongelukige Voyagie von t'Jacht de Sperwer "gedestineert na Tayovan in t'jaar 1658, hoc t'selve Jacht op "t'Quilpaarts Eyland is gestrant : als made een pertinente "beschryvinger der Landen, Provintien, Staten ende Forten "leggende in t'Coningryk Coree. Rotterdam 1668, 4to."*

That is : Journal of the unfortunate voyage of the yacht "The Hawk" destined for Formosa, how the same yacht was stranded on Quelpaert Island, with a pertinent description of the countries, provinces, towns and forts in the Kingdom of Corea."

This book, of which a French edition is also known (Paris 1670, 12mo.) I could not find, but I was able to read the French translation in the "*Recueil des voyages au Nord, contenant divers Mémoires très utiles au commerce et à la navigation, Amsterdam*," Jean Frédéric Bernard, 8 vols. 12mo. 1782 and other dates, which is in the Library of the North-China Branch of the Royal Asiatic Society.

In the fourth volume, pages 310-311, we read :

"Nous n'y avons point vu d'éléfants, mais on y voit des Kaymans ou crocodiles de différente grandeur, qui se tiennent dans les rivières. Leur dos est à l'épreuve du mousquet, mais ils ont la peau fort tendre sous le ventre. Il s'en trouve qui ont dix-huit à vingt aunes de long, la tête large, le groin de pourceau, la gueule fendue jusqu'aux oreilles, l'œil perçant, mais fort petit, les dents blanches et fortes, rangées comme celles d'un peigne. Ils ne remuent en mangeant que la machoire d'en haut. L'épine du dos de cet animal a soixante vertèbres, et il a de longues griffes aux pieds, sa queue est aussi longue que le reste de son corps. Ils mangent également la viande, et le poisson, et sont friands de chair humaine : les Corésiens nous ont souvent dit qu'on avait trouvé une fois trois petits enfants dans le ventre de l'un de ces crocodiles." Now this Hamel von Gorcum was a man of some education, being the secretary of the ship. Made prisoner after the wreck of his ship with the fifteen sailors who had not perished (August 1653) he was taken to the mainland of Corea where he was kept in captivity, first in the capital then in the southern districts, and had ample opportunities of studying the country. With seven of his companions he, at last managed to seize a native fishing junk and reached Nagasaki where he found his com-

patriots after a captivity of thirteen years and twenty eight days (1652 to 1666). With the exception of some letters from the Roman Catholic missionaries which can be read in "*L'histoire de l'Eglise de Corée* par Ch. Dallet, 2 vol., Paris 1874," this is the only reliable description of Corea we possess from foreign sources. I searched through this last book, but could not find any mention of the Caïmans amongst the productions of the country therein described.

However, Monseigneur Ridel, the well-known bishop of Corea, who has resided many years in the country and has just escaped for the second time from the prisons of this inhospitable land, tells me that he has often heard the Coreans speak of a huge kind of lizard living in the rivers. It is fond of coming out on the banks to bask in the sun's rays. He has also read of these large saurians in Corean books, but he does not remember that any of his missionaries, of whom five are still in the country, have seen them. Not having his books with him he was unable to give me the Corean names and characters by which these animals are known.

It would be exceedingly interesting to find out what kind of Alligators these are. Judging from the high latitude in which they are found they probably belong to the same species as the one here described. Though they have not yet been found in Japan it is not impossible that they should be discovered there one day, and, if so, it would not be perhaps too wild a theory to suppose that North-Eastern Asia and North-Western America have been connected at some very ancient period. This theory could also be supported on other grounds. For instance, some of our Chinese Unionidæ are also found in Northern America, and some rare birds, plants and animals are also common to both countries.\*

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### III.—NATURAL HISTORY.

In Wallace's "*Geographical distribution of animals*, 2 vols., London, 1871." Vol. II., page 406 we find :

"Alligatoridæ, 1 genus, 10 species.—The Alligators which are distinguished by having both the large front teeth and the canines fitting into pits of the upper jaw, are confined to the

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\* Some people even pretend to find an ethnological connection between the Red Indians and the Chinese.

Neotropical and southern part of the Neartic regions from the lower Mississippi and Texas through all tropical America, but they appear to be absent from the Antilles. They are all placed by Günther in the single genus Alligator."

This book is the latest authority on the subject so we are now sure that up to now Alligators were unknown in the old continent.

Now, one of our Roman Catholic missionaries, Reverend Father Seekinger tells me that Alligators are quite common in his district (Ning kuo fu, Wuhu, Chinkiang). Children play with the young ones and larger specimens are captured in a long and narrow box. They are then killed, and the skin, with head attached, is sold for medicine. The local name for them is *Tu Lung* i.e. Earth Dragon.

In conclusion I may state that the specimen sent to the Paris museum arrived in good order. I have just received a letter from the learned director, Mr. Fremy, who considers the animal as a new and exceedingly interesting species for which the name proposed by me of *Alligator Sinensis* (Chinese Alligator) has been accepted.



## ARTICLE II.

# PERIODICAL CHANGE OF TERRESTRIAL MAGNETISM.

BY F. W. SCHULZE.

### CHAPTER I.

GLANCING over the contents of Whitaker's Almanack for 1878, my attention was called to the remarks in a short article on Terrestrial Magnetism, "that the dip, like the declination, is subject to secular, and other variations, the true laws of which are not yet understood, etc."

Thinking it possible to give a satisfactory account of these changes, I herewith attempt a modest essay to do so.

According to Miller and Pouillet's, "Lehrbuch der kosmischen Physik," Braunschweig, 1856, the variation in Paris has been Easterly before 1663 decreasing. By Sir James Ross, the latitude of the magnetic North Pole is in the parallel of  $70^{\circ}$  N.; and bearing in mind, that the magnetic needle (if not deflected by local attraction), points to the magnetic pole, it is only natural to suppose, that prior to 1663, the magnetic North Pole must have been somewhere to the northward and eastward of Paris, moving towards the meridian of Paris probably in the latitude of  $70^{\circ}$  N. and passed near the meridian of Paris in 1663, in which year the variation was Zero; then the magnetic pole continued its westerly movement until 1814; the variation attained in that year its western maximum of  $22^{\circ} 34'$ . Since then, the pole continuing its westward motion, the westerly variation at Paris decreasing, until about the year 1965, the pole passes near the meridian of  $180^{\circ}$ , by the west of Paris, when at the latter place the variation will become Zero, and becoming easterly again afterwards attaining its eastern maximum when the pole passes the meridian of  $90^{\circ}$ , east of Paris, in about the year 2116; then the eastern variation at Paris will decrease becoming Zero, when the magnetic pole returns to the meridian of Paris, about the year 2267.

For illustration, take a terrestrial globe, and a ball of twine and attach the end of the twine to the geographical position of Paris; then place the ball on the same meridian, but on the parallel of  $70^{\circ}$  N. lat.; in which latitude perform an act of pa-



rallel sailing by means of the ball, to the westward, slacking the twine as required, but keep it sufficiently tight to represent a segment of a great circle; after passing the meridian of  $180^\circ$ , roll in the twine as required, until the ball returns to the meridian of Paris, in  $70^\circ$  N. lat. whence it departed. The direction of the thread has undergone the same variations, that the magnetic meridian of Paris is subject to, on the surface of our earth.

It is true the variation at Paris, would change exactly the same way, if in 1663, the magnetic pole had been in  $70^\circ$  N. lat. and  $180^\circ$  long. (from Paris), shifting in an easterly direction towards the meridian of Paris; but, recollecting that the dip of the needle increases, when we approach a pole, it must be the same thing if the pole approaches us; now the inclination at Paris is decreasing since 1671, the earliest reliable record (given in the above quoted work on cosmic physics) at my command. Therefore the variation pointing to the northward, and westward of Paris as the present position of the magnetic pole, and the dip of the needle indicating it is moving away from Paris, it cannot be in an easterly direction, but must be westerly, at least as long as no valid reason exists, to suppose that the magnetic pole changes its latitude also.

The inclination has probably been decreasing since 1163, when it must have been a maximum (the magnetic pole passing then between the true one, and Paris); it will become a maximum about the year 1965, and then increase again until about the year 2267, when the magnetic pole will return to the meridian of Paris.

The secular variation of the compass shews, that the magnetic pole is moving round the true pole, and the inclination decides, that it must be from east, towards the west; at about the rate of 151 years for the quadrant (from the meridian of Paris in 1663, to  $90^\circ$  west of Paris in 1814), or about 604 years for a complete revolution, or at the yearly rate of about half a degree at a rough estimate.

An inspection of Duperrey's chart of magnetic meridians, shews the irregularity of those curves; therefore the calculations introduced cannot claim to be mathematically exact, the full truth perhaps will only be learned by careful observations, and experience of future centuries.

Now, take again a globe, and construct roughly a movable system of magnetic meridians around it, with a circle equidistant from the magnetic poles, to indicate the magnetic equator; then place the magnetic North Pole on the parallel of  $70^\circ$  N. lat. and move the magnetic pole on that parallel round the true

one, from east towards the west; you will then have a fair representation of the movements of the whole system of magnetic lines, as it really occurs on our earth; a precession of the magnetic equator on the geographical one from east, towards the west, will take place, and a nutation of the magnetic poles round the true ones, in the same direction.

In this chapter we have seen how the secular changes are taking place, in the following one I hope to shew more explicitly the reasons why.

## CHAPTER II.

SINCE writing the first chapter I have been favoured by the kindness of a friend (to whose valuable assistance I am much obliged in compiling these lines) with a copy of "Magnetism and Deviation," by John Merrifield, LL.D., F.R.A.S., etc., London, 1874, in which I find on page 15, the following passage:—"Professor Barlow, in his Essay on Magnetic Attraction, says, "all these variations can be accounted for by supposing the "Magnetic Poles to revolve round the terrestrial ones from "West to East, at about  $20^{\circ}$  from the latter in periods of about "600 years. Sir W. Hamilton gives a contrary direction to the "revolution, and states the period to be 900 or 1,000 years."

I am not astonished that others should have conceived similar ideas to mine, before me. However, Professor Barlow gives a wrong direction of the revolution, and Sir W. Hamilton, allows perhaps too many years for its completion.

Commander W. Walker, R.N., in his book, "The Magnetism of Ships and the Mariner's Compass," London, 1863, page 8, speaking of Columbus, who had discovered the variation of the Compass, writes as follows:—"On his return to Spain his statement, "that the direction of the Compass had varied was not believed.

"Although other Navigators had observed and announced "the variations of their Compasses, the learned of those times "would not admit the fact, they rather choose to charge sea- "men with ignorance, and inaccuracy in their observations, "then admit errors in the principles established by themselves.

"Pedro de Medina, in his *Arte de Navegar*, 1545, denies the "variation of the Compass; Martin Cortez, in a treatise on "Navigation printed at Sevilla before 1556, treats it as a thing "completely established. So here we see, that a period of 60 "years elapsed from the time of Columbus, observing and re- "porting the variation of the Compass before the truth of its "existence was admitted."

I hope it will require less time, before the truth of what I may be permitted to call "The Rotation Theory" will be admitted.

Mr. Merrifield gives the date of Captain Ross's discovery of the Magnetic North Pole, the year 1830. According to the theory deduced in the preceding chapter the Magnetic Pole must have been in  $90^{\circ}$  W. of Paris, in 1814. Moving from that year to 1830, at about  $85^{\circ} 45'$  per year nearly, to the Westward,  $=9^{\circ} 32'$ , which would place the Magnetic Pole in  $99^{\circ} 32'$  West of Paris, or about  $97^{\circ} 12'$  West of Greenwich; Sir James Ross found it  $96^{\circ} 42'$  West of Greenwich, half a degree from where I would place it approximately; I consider this the most conclusive proof of the soundness of the basis upon which my theory is founded.

From the same book of Mr. Merrifield's, I see that Capt. E. J. Johnson, R.N., F.R.S., places the maximum ( $24^{\circ} 27'$ ) of Western variation in 1815, but Colonel Beaufoy gives  $24^{\circ} 21'$ , as maximum in 1819, less modern observations, owing to the then still more imperfect instruments, can therefore hardly have been very correct, and calculations based upon them cannot be very reliable; however, they are quite sufficient to establish the principle in question firmly.

And now we will try to investigate the cause of this Magnetic Polar rotation.

Allowing that the thermometer rises one degree (celsius) for every 90—100 feet, towards the centre of the earth, (after Müller and Pouillet, *Lehrbuch der kosmischen Physik*), "at a depth of about 10,000 feet water would boil, and at about 20 nautical miles, basalt and iron would melt," but I will be liberal and allow 25 miles below the surface of the earth as the limit, where we would meet a fiery molten mass.

According to "The Border lands of Geology and History" by Thomas W. Kingsmill, Shanghai and London, 1877, by Mr. Mallet's "Physico-chemical Theory," "the earth is now a ball entirely, or in the main solid, but of high temperature." In the same work Mr. Kingsmill tells us of Sir W. Thomson, "but although he rejects a fluid nucleus (of the earth) he acknowledges, that the absence from the sea of long period tides is not easily explained without admitting a considerable degree of yielding." "If the interior of the earth were liquid and its crust composed of so rigid a material as steel, and 300 miles thick, it would yield to the deforming influences of centrifugal force, and the attraction of the sun and moon, as if it were India rubber; under such circumstances, as the whole mass of the earth would be free to move, there could be no flow of



"tides, sea and land yielding equally to external influences."

I will not enter the field against Astronomers and Geologists; I am content to let them fight their own battles; probably the truth lays in the middle: "*les extrêmes se touchent*;" therefore I will try to steer a pretty clear mid channel course between the Scylla of solid ball, and the Charybdis of fluid nucleus theories.

Presuming at about 25 miles below our earth's surface the heat intense enough to melt all known rocks and metals, I should think it very unlikely, that the limit between solid crust and fluid interior were defined, as if cut off with a knife; I think one would be gradually verging into the other, more or less in the following order:—Outside solid crust about 25 miles; then accumulating solidifying, semi-liquid slake, succeeded by molten fiery mass. Now, let us consider what would be the pressure of such a mass at about 2,000 miles from the surface on a square foot.

Accepting the specific gravity of the earth as five times more than distilled water (according to F. Reich, 5.58, and Baily 5.66), then a column of 2,000 nautical miles = 12,160,000 feet deep  $\times$  1 foot  $\times$  1 foot of distilled water at 60.5 lbs. per cubic foot, will weigh 785,680,000 lbs. = 328,428 tons, multiplied by 5 (specified weight of earth roughly) = 1,642,140 tons pressure upon a square foot on the surface of the earth, the same column if placed upon a square foot at 2,000 miles below the surface would probably weigh less—(I am not prepared to say how much)—therefore we will disallow a whole million of tons, and still the enormous weight of 642,140 tons remains; but even then there is such a tremendous pressure upon the square foot, that I believe no molten mass of whatever high temperature could remain liquid under such a stupendous force, but would obtain a state of almost inconceivable density, that steel compared to it would be like cheese.

Late experiments have shewn, that almost all known gases by application of extreme cold, and high pressure can be forced into the liquid aggregate state first, then into the solid state afterwards; and since it is assumed that our whole earth from a gaseous state of high temperature cooled down into its present condition, I cannot be far wrong in representing the nucleus of the earth as possessing indeed an enormous high temperature, but solidified by excessive superincumbent pressure.

These suppositions being accepted as approximately correct, would give us a body of "a considerable degree of yielding," to account for the absence from the sea of long period tides,

and still not so elastic as India rubber, as not to shew any tides of the sea at all.

Allowing under the solid but sufficiently yielding crust of the earth a fiery liquid, with a fiery solid nucleus within, we must allow that the influence of the same heavenly bodies, which cause the tides of the liquids outside the earth (the Ocean) will do the same with the fiery Ocean within; and this daily interior flood wave will cause a retardation of revolution in the interior fluid mass in exactly the same manner, as it does in the Outer Ocean; it causes a westward tendency in the former as well as in the latter, and which I must suppose to be too well and generally understood, that I need not enter here into the explanation; because it is not my object to explain things which others have done much better than I can; but to demonstrate if possible the nature, and causes of the magnetic needle's periodical variations.

Admitting this daily retardation of the fluid interior inclusive the solid nucleus within it (like a sluggish compass card, that remains behind, when the ship's head moves round), it does not matter whether we say, in about 604 years, the outside shell of the earth makes one revolution ahead of its contents, or whether we say, the latter remains one revolution behind the former; the effect is the same, provided we can prove the nucleus of the earth to be the carrier of Terrestrial Magnetism; because in that case the nucleus with its Terrestrial Magnetism would be like a powerful magnetic needle (suspended in a spherical compass bowl), moving in a liquid (like in an ordinary liquid compass).

In the next chapter it will be attempted to shew the high probability why the nucleus of the earth should be the carrier of Terrestrial Magnetism.

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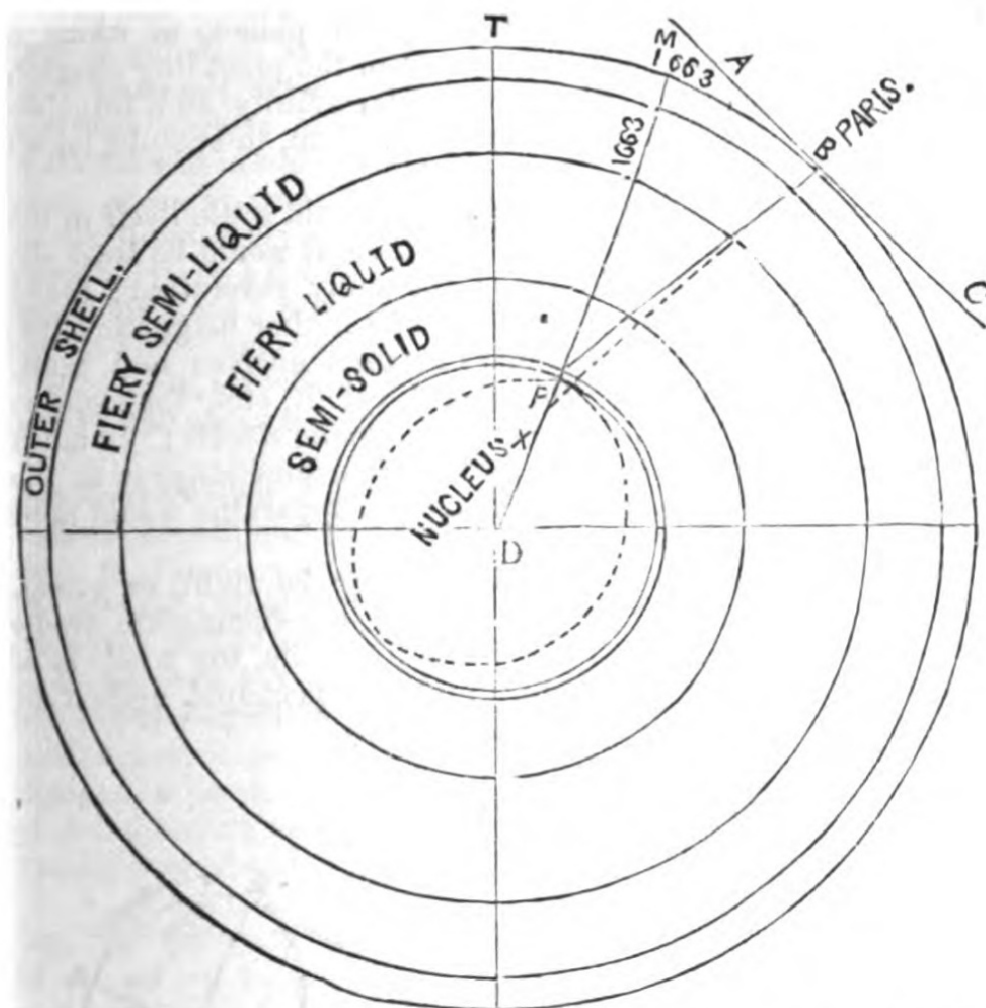
### CHAPTER III.

IN the accompanying figure, let M represent the magnetic pole in 1663, passing between the true North Pole T and the geographical position of Paris. A—C is the horizontal line at Paris, and the angle A B P of  $75^\circ$  the assumed maximum dip of Paris in the same year, probably near the truth; P is a point in the interior of the earth, where the inclination needles from, the surface pole M and Paris, would intersect at the pole of the nucleus P, fixing as it were, the latter by crossbearings,

I am aware, that in reality this is not exactly the case, but do not doubt that a good mathematician could easily lay down



the unknown point X accurately, the position of the actual magnetic pole upon the earth's nucleus:—



Commander W. Walker, R.N., in the before mentioned book, says, (page 17), after giving a list of bodies capable of magnetism besides iron, "Sir W. Harris found, that by condensing "metals, their magnetic energy was increased, and that substances remain magnetic or take up magnetism more quickly, than they part with it."

This seems to imply, that magnetism can be generated in bodies by increasing their density, or, as I may say: if the density of bodies is increased by external force, then the latter performs partly the work, which previously affinity had to do, in keeping the molecules of the bodies together, and hitherto latent affinity becomes free, putting in an appearance as magnetism; or, by high pressure, a certain amount of affinity of bodies, through increasing their density

mechanically, becomes free and translated into magnetism.

For fuller exposition of this view see first appendix.

Now I believe the enormous power of gravity a couple of thousand miles below the surface of our planet, of which a rough estimate has been introduced in the preceding chapter, sufficient to disengage enough molecular affinity and translate it into what we call terrestrial magnetism, to account for all phenomena of the latter.

The magnetic matter of the nucleus would settle itself in the axis of the earth's rotation, because there it would be least disturbed by the centrifugal force of the daily revolution; round the poles of the nucleus, all bodies of a higher magnetic capacity contained in the molten mass between nucleus and crust, would collect, especially iron, nickel, cobalt, etc., the same as iron filings gather to the poles of a magnetic needle; or much in the same way as we arm a natural loadstone magnet at the poles by soft iron; the whole magnetic apparatus would most likely represent an oval shape.

The explanation here introduced may be right, or wrong, still terrestrial magnetism tells us by the inclination needle from its residence, and no doubt also its cradle, the nucleus of the earth; "J'y suis, j'y reste," and my principal endeavour is to account for its *periodical changes* only.

#### CHAPTER IV.

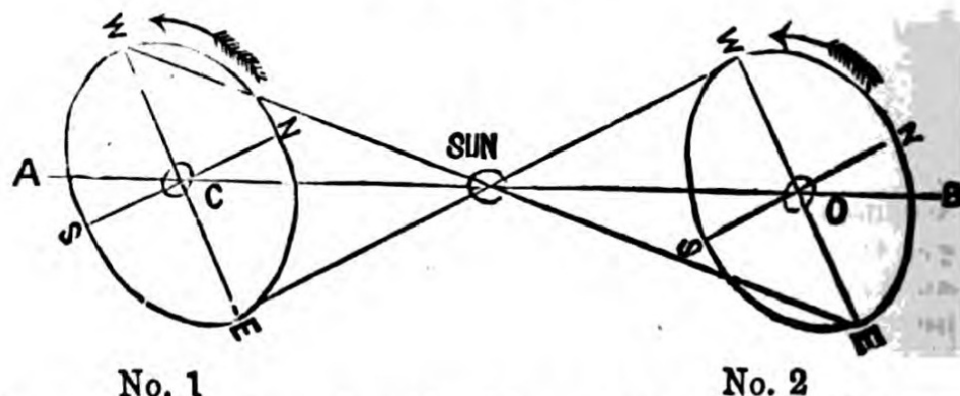


FIGURE No. 1 is the spheroidal form of the earth at the summer solstice; A B is the plane of the ecliptic; W E the plane of the equator; N S the polar axis, and to the right is the sun.

During the summer solstice the sun attracts E more than C or W; the effect of this would be to place N S at a right angle with A B in the direction of the arrow; this is prevented by the centrifugal force of the earth's daily revolution from west to east, which brings constantly other masses of the revolving

earth under the stronger point of attraction of the sun in E; the consequence is a circulation of the earth's more yielding fluid interior, as a result of the parallelogram of forces brought to bear upon it; this circulation, if graphically illustrated, would represent an oval shape, the greater axis of which would be congruent with the axis of our planets magnetic nucleus.

In figure No. 2 is the earth at the winter solstice; W is more attracted than C and E; the tendency is to elevate N S at right angles to A B in the direction of the arrow; the influence upon the interior is the same as in fig. No. 1.

Place sun and moon for ever on the equator, or place them for ever at the poles, and the magnetic axis of the earth would soon coincide with the axis of rotation, because the interior circulation would then be deprived of its reason to exist.

It will be seen that during the summer solstice the influence of the sun's attraction must be greater in the northern hemisphere, which will cause the greater amplitude of magnetic fluctuations during the summer months; during the winter months the sun's attractive power must be less in the northern hemisphere, consequently also the amplitude of hibernal magnetic fluctuation.

During the equinoxes the sun's attraction is impartially exercised in both hemispheres, and now the moon's influence becomes to be most apparent, her attractive power being so much greater than the sun's, because she is so much nearer the object of attraction; add to this the celerity with which she constantly changes her position and it will be accounted for why Father Secchi says: "the annual disturbances of the magnetic elements are at a maximum at the equinoxes, and at a minimum at the solstices."—(Merrifield.)

The magnetic equator laid down on a terrestrial globe almost coincides with the plane of the ecliptic in the Atlantic Ocean; from the interior of South America it runs in a W.N.W. direction towards the geographical equator and follows close to the latter a parallel course to the same across the Pacific; it crosses the geographical equator where the *plane of ecliptic cuts the latter*, and then again follows an almost parallel course to the geographical equator through the Indian Ocean; in the interior of Africa again it almost coincides with the plane of the ecliptic, substantiating as I think, my supposition, that the eccentricity of the earth's magnetic axis may be due to the tendency of the axis of rotation to set at a right angle to the plane of the ecliptic counteracted by the daily revolution round the axis of rotation.

## CHAPTER V.

Month.	1st	2nd	Month.	1st	2nd
	'	°		'	°
Jan.....	6· 7	— 1·90	July.....	12· 1	+15·04
Feb.....	7· 4	— 0·15	August ...	13· 0	+14·43
March .....	11· 9	+ 2·74	Sep.....	11· 8	+11·75
April .....	13· 9	+ 6·88	October ...	10· 3	+ 7·97
May.....	13· 5	+10·92	Nov.....	6· 9	+ 3·25
June .....	12· 5	+13·94	Dec. ....	5· 0	+ 1·32

In the first column of above table is the mean amplitude (or angle comprised between the greatest eastern and western deviation of the needle from the mean daily variation) per month, as observed at Göttingen in minutes and tenths of arc; in the 2nd column is the result of six years' observations at Berlin, from 1829 to 1834, expressed in degrees and hundredths Réaumur, giving the mean temperature of every month.

It will be seen that the maxima of the needle's mean monthly variation in the first column does not coincide with the maxima of the mean temperature in the 2nd column, which seems clearly to prove, that thermo-electricity has not much to do in causing the daily variations; in June and July the mean monthly variations are not so great (as in the two preceding months), although they have a higher mean temperature; the reason is because on the first of July the sun is in Aphelion, and his attraction decreases inversely, as the square of his distance increases.

The table also shews that not in January and February, when the mean temperature is least in Central Europe, diurnal variation attains a minimum, but in December, when the sun is farthest away from the northern hemisphere on account of his maximum southerly declination; another proof, that periodical change of variation cannot be dependent upon thermo-electricity produced by the sun, as supposed by many; but the greater or lesser proximity of the celestial bodies and their ever varying position principally must be looked to, to account for these periodical changes.

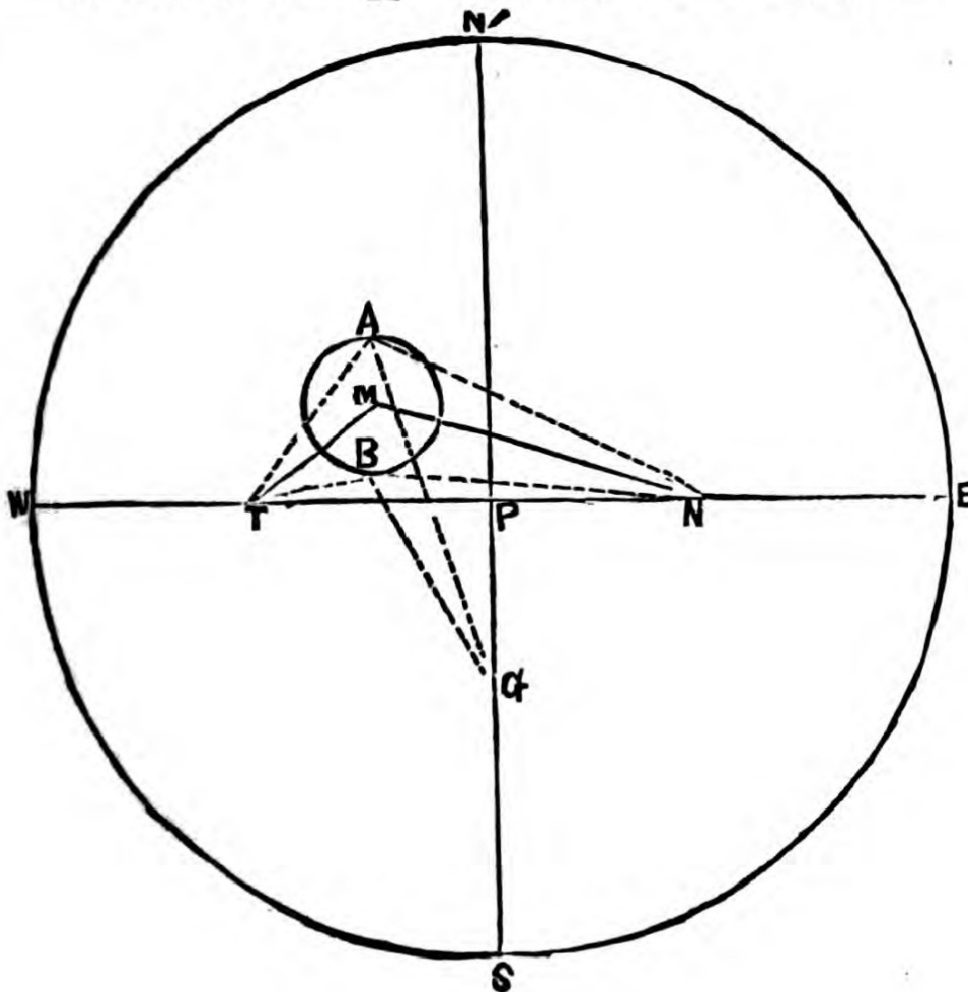
Unfortunately from the southern hemisphere I have no material at hand, beyond the scanty information, that the direction of the needle there is subjected to the same changes, as in



the northern hemisphere, but in an opposite direction; I have however no doubt that there the maximum of daily variation must take place about Christmas, the sun being then in Perihelion and attaining his greatest southern declination.

At the instigation of Humboldt, in the years 1828 to 1830, hourly magnetic observations were taken on previously arranged days at Berlin, Freiberg, Nicolayew and Kasan, by which a remarkable parallelism of the needles changes was proved; still more so by the labours of the Magnetic Society under the presidency of Professor Gauss, about the year 1838, to which twenty-seven observations belonged, from St. Petersburg to Dublin, from Upsala to Milan.

The following well established facts are the result of their labours; the diurnal variations are not local, but alike in places of nearly the same geographical longitude (no doubt still more so in the same magnetical longitude); if in one place a minimum of variation occurs,  $90^\circ$  east and west of the same, maxima will occur, but in opposite directions to one another:—





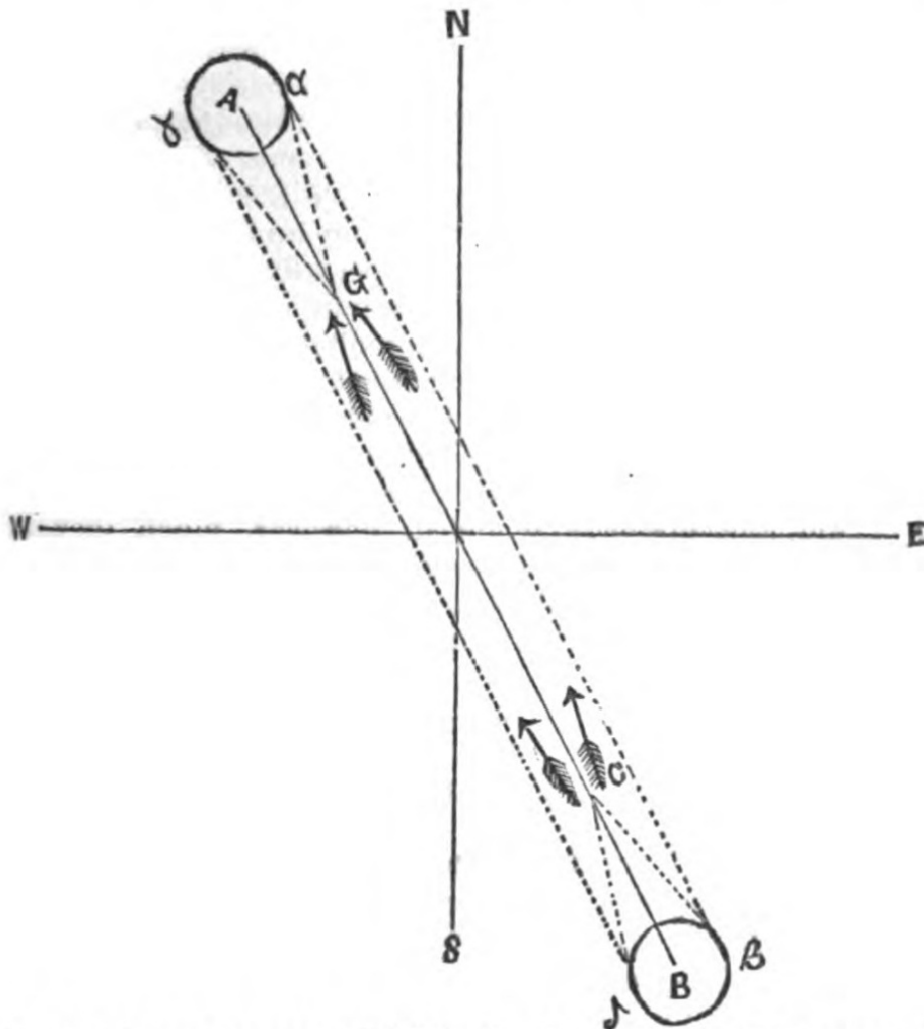
The above figure is the northern hemisphere in polar projection; N' E S W is the equator, P is the geographical pole, M the magnetic one; T is intended for the geographical position of Toronto, N the same for Nertschinsk, G the same for Göttingen, W E is an east and west line; N' S a north and south one. Toronto and Nertschinsk are about  $180^\circ$  of long. from one another, Göttingen is nearly in the middle between the two. From a diagram on page 495 of Müller and Pouillet's work, it can be seen that a maximum of easterly variation occurred at Toronto on the 27th and 28th August 1841. Angle B T M of present diagram at 1 a.m., when at Nertschinsk a western maximum (angle M N B) occurred, indicated by the dotted lines T B and B N, converging at the point B to the southward of the mean magnetic pole M; another maximum of eastern variation occurred at Toronto at 1 p.m., and at Nertschinsk was a maximum of western variation at 2 p.m.

At 11 a.m. we find in Toronto a western maximum (angle A T M) and in Nertschinsk an eastern one (angle A N M), and so forth.

A careful inspection of all the other diagrams given (and to which I must refer here, not wishing to transgress too much), makes the impression of a clearly indicated magnetic tide wave passing several times over the places mentioned; especially clearly shewn by the diagram on page 492 of M. and P.'s work, which represents the daily variation at Upsala, Göttingen and Milan, on the 28th and 29th May 1841.

This seems to suggest that indeed subterranean solar and lunar tide waves occur complicated, and interfering with one and other, and therefore apparently irregular at neap tides; but showing clearly and simple when both solar and lunar tides become united to a single one.

Now referring to our diagram (on page 11), the needle at T and N cannot point to A and B, unless at the same time the magnetic pole is in those places, and since we know, that in Europe the inclination in the forenoon is greater than in the afternoon (about 10 a.m. maximum and about 10 p.m. minimum), we would have by the diurnal periodical change a clear indication of the actual magnetic pole's revolution round its mean daily position.



In the above diagram W E is the Equator, and N S a north and south line ; G is the assumed position of Göttingen in the northern hemisphere, C is the same of the Cape of Good Hope in the southern hemisphere ; A is the magnetic North Pole, B the magnetic South Pole, and A B consequently the axis of Terrestrial Magnetism. Now, when in G the eastern maximum A G  $\alpha$  of daily variation occurs, at C the western maximum  $\beta$  C B occurs, and the magnetic axis A B is transferred to  $\alpha$   $\beta$  ; the reverse takes place, when in the northern hemisphere the maximum of daily western variation A G  $\gamma$  occurs, in the southern hemisphere an easterly maximum  $\delta$  C B must occur, and the magnetic axis is shifted from A B to  $\gamma$   $\delta$  . Since it is understood that the poles of the needle point towards the magnetic poles of the earth, and since the inclination needle shews that the seat of Terrestrial Magnetism (see 3rd chapter) is deeply below the surface of our planet, the only

natural inference that can be drawn must be that the attraction of sun and moon influence the nucleus of the earth in such a manner as to draw it bodily towards themselves, and so force it to circumscribe a circle with its centre round its mean daily position by following closely the movements of sun and moon from east to west; boldly pointed out by the variation needle at full and change; flickering, wavering and uncertain, when sun and moon are in quadrature; especially if we allow around the poles of the nucleus a softer magnetic matter, collected like an armisture from the surrounding molten mass.

But the centre of the nucleus cannot describe a circle round its mean daily position, without the magnetic poles also describing a circle around their mean daily position; a fact which always will be recognisable by watching closely the diurnal variations, dip and intensity included, however, much they may appear to be confused and disguised by the ever shifting positions of the heavenly bodies, and also by the increasing or diminishing distances of the magnetic poles from the observer.

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## CHAPTER VI.

Knowing that all substances are more or less magnetic, and that they are very unequally divided in the earth's solid crust, it is not surprising, that deviations of the needle from its straight direction to the Magnetic Poles should occur all over the world, causing irregularities of the magnetic lines; they are simply deviations of the needle caused by local attraction of Continents, Islands, the presence of rich deposits of magnetic substances in the vicinity, &c.; Müller and Pouillet give two points of greatest magnetic intensity on the surface of the Northern hemisphere: one in North America, and the other in Northern Asia.

For illustration, I extract one very striking instance from Dr. C. Rümcker's *Handbuch der Schiffahrtskunde*, Hamburg, 1857, translating from page 888, as follows:—"One of the most remarkable phenomena of this kind is on the Northern Coast of the Gulf of Finland, within the headland of 'Hangoe,' near the Jussary Cliffs; vessels of 12 to 15 feet draught may pass to the Eastward of Jussary Gadder, when, in line with Western Gadd and Lerharn, all compass needles in 10 fathoms will turn 180° round their axis, returning afterwards to the usual direction."

Captain Duperrey's charts of magnetic lines shew a remarkable parallelism of Magnetic Meridians between the true and Magnetic Poles, especially in the Northern hemisphere which can be best accounted for, if we admit the circulation of magnetic matter round the nucleus, deflected from the axis of rotation by the nutatory influences of the principal Celestial bodies, see 3rd chapter,

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## CHAPTER VII.

### RECAPITULATION AND CONCLUSION.

REVIEWING briefly the ground we have travelled over in the preceding chapters, it will be recollected, that in the first one an explanation is given, how secular change of variation is effected; the Magnetic North Pole moving round the true one in about latitude  $70^{\circ}$  N., and about 604 years from East to West; the great closed curve of no variation divides the globe nearly in a hemisphere of Westerly variation on the right hand (looking from the Magnetic North Pole towards the true one), and the hemisphere of Eastern variation to the left (the latter enclosing an oval of Western variation in Eastern Asia); move a system of magnetic lines around the Terrestrial Globe from East to West, keeping the Magnetic North Pole on the parallel of  $70^{\circ}$  N. latitude, and the phenomena of secular variation are almost mathematically exact represented.

In the 2nd chapter it is tried to reconcile the conflicting theories of fluid interior and solid ball, in regard to the earth's internal structure, as advanced each by high authorities; introducing gravity as a highly probable agent to compress the nucleus of our planet, although of the highest temperature into a solid body of the utmost density; and subterranean tide waves are pointed out, as most likely to cause one retardation of revolution of the nucleus, suspended within a molten mass, in about 604 years.

The 3rd chapter shews by means of the inclination needle, that indeed the nucleus of our planet must be the seat of Terrestrial Magnetism, and the whole similarity of our globe to the ordinary liquid compass; the solid nucleus being the magnetic apparatus suspended near the centre of the earth by fiery liquid mass; also the possibility is hinted at, that the excessive force of gravitation towards the Terrestrial centre might be the cause of Terrestrial Magnetism. The likelihood is



represented of the whole magnetic central apparatus having an oval shape, and that the divergence of the magnetic axis from the axis of rotation may be a compromise between the centrifugal force of the earth's quotidian revolution, and the tendency of the celestial bodies to elevate the rotatory axis of the fluid interior at right angles to the ecliptic (owing to the spheroidal shape of the earth), by an ecliptic circulation of fluid mass.

In the 4th chapter sun and moon are called upon, to explain by their attraction and different positions at various times of the year the periodical annual changes, and the improbability is shewn of thermal-electricity being the cause of them, as most authorities on this subject seem to have surmised.

In the 5th chapter, it is shewn how a daily displacement of the magnetic axis takes place; and since that can hardly be done, unless the magnetic body itself be displaced, it must be accepted as proved, that the magnetic terrestrial nucleus itself is being removed, attracted towards sun and moon, and thereby describing a circle round its mean daily position from East to West, following the movements of sun and moon, causing thereby a daily nutation of the actual Magnetic Poles round their mean daily position; this actual displacement of the nucleus in the direction of sun and moon, when both pass the meridian together would to my mind account better for a *flood wave* occurring  $180^\circ$  away from the meridian passage, than the best calculation I have ever seen, but never clearly comprehended, concerning this phenomenon.

What Humboldt has called magnetic storms is perhaps most likely to happen, when perigee and full moon occur together, especially at the time of perihelion; and the inhabitants of volcanic regions may then stand by for subterranean squalls. The diurnal nutation of the magnetic poles may be obscurely indicated only, sometimes by the declination needle for reasons pointed out; but it is imperatively proclaimed by dip and intensity, which clearly establish an approach of the magnetic pole during twelve hours towards the observer and the departure from the same during another twelve hours.

The result of these various movements is an epicycloidal track of the magnetic poles round the true ones in about 604 years from east to west.

The 6th chapter treats on some minor matters, pointing out the probable influences of local attractions, etc.

Many ideas which suggested themselves while writing, I have excluded, as not immediately bearing upon this subject; but perhaps may add them on some future occasion, as an appendix.



My sources of information have been mentioned in the body of these pages.

I trust it can be admitted in fairness to the writer, that nowhere wild speculations, which cannot be substantiated, have been advanced; but that everywhere only natural inferences have been drawn from established facts.

I cannot close this essay without acknowledging gratefully my indebtedness to Captain J. H. P. Parker, Commander of the China Navigation Company's steamer *Newchwang* for the many facilities and valuable assistance rendered me, while writing the preceding chapters.

Owing to the limited material at my command, when compiling these pages, my judgment may have erred on minor matters; but I believe to have given *at least in rough contours* a correct theory of Periodical Change of Terrestrial Magnetism.

*Note.*—Since the manuscript has been returned to me to see the proofs of the woodcuts, I have had an opportunity to read Mary Somerville's "Connection of the Physical Sciences," in which the view is advocated, that Terrestrial Magnetism owes its existence to induction by electricity, evolved by the earth's revolution around its axis; but I am more in favour of Sir W. R. Grove's opinion, who in his "Correlation of Physical Forces," London 1874, page 9 says:—"But magnetism may now be said with equal truth to be the cause of electricity, and electrical currents may be referred to hypothetical magnetic lines; if therefore electricity cause magnetism and magnetism cause electricity, why then electricity causes electricity, which becomes, so to speak, a *reductio ad absurdum* of the doctrine." However electricity certainly does cause electricity by induction in bodies near it.

Mrs. Somerville writes in her above named work: "Dr. Faraday observes that such is the facility with which electricity is evolved by the earth's magnetism, that scarce any piece of metal can be moved in contact with others without a development of it, and consequently, among the arrangements of steam engines and metallic machinery, curious electro-magnetic combinations probably exist, which have never yet been noticed." Perhaps I may be excused for introducing here an extract from a letter addressed to the editor of a local paper as a curious specimen of terrestrial magnetic action:—

#### STEAM NAVIGATION.

Having noticed the extremes of propeller blades to be more subject to corrosion at their front than anywhere else, I have asked several profes-

sional gentlemen for an explanation, without however receiving a satisfactory answer.

It appears that the brass sheathing of the shaft, etc., in connection with the propeller, forms a closed circuit in the sense of the *British Association Experiment* (compare Deschanel's *Natural Philosophy*, by Professor Everett, London, 1873), and that the electric currents generated by the metal's rapid revolutions across the field of force of terrestrial magnetism have the tendency to escape by the most projecting points, which, in our case, are the propeller blades. Now, the nearest and most powerful conductor for electricity is the iron ship immediately in front of the blades, and "there appears to be no real exception to the rule that electricity, in traversing an electrolyzable liquid, always produces its full equivalent of decomposition."—(Ibid, page 646).

The "electrolyzable liquid" in this instance is water, which, being decomposed into its constituent elements, hydrogen and oxygen, will allow some of the latter to combine with the metallic surface of the electrode—(front of blade)—forming oxide, i.e., corroding those parts of the blades in question.

The above may appear to many readers an idle speculation without a practical object, because the generation of electric and galvanic currents and their consequent chemical action cannot be prevented; but a means of escape more eligible to the current can be provided by a cylindrical circumference (like a hoop) of thin boiler plate, connecting or rather encircling the blades and projecting an inch or two towards the ship, the width of the ring to be decided by experience. The electricity would escape by means of this convenience, and would *corrode it instead of the propeller*; affording at the same time additional protection to the latter from fouling by ropes, fishing gear, etc.

Friends to whom I submitted the idea embodied in this extract objected to it as unpracticable; but the very screw propeller has been opposed by parties then considered competent, as impractical and objectionable, until practically introduced and approved.

## FIRST APPENDIX TO "PERIODICAL CHANGE OF TERRESTRIAL MAGNETISM."

### 1.—On the nature of Terrestrial Magnetic Poles.

SOME interesting information concerning Terrestrial Magnetism is contained in the introduction to Horsburgh's first volume of the *India Directory*, 6th edition, London, 1852. Captain Horsburgh says, page XVII:—"Mr. John Churchman, an American who was a member of the Imperial Academy of Sciences, St. Petersburg, and Mr. Ralph Walker, the civil engineer, formerly of Jamaica, appear to have published, nearly at the same time, an ingenious hypothesis with a view of solving all magnetical problems, relating both to the vertical and hori-

“zontal declination of the needle. In a diagram of the two  
“hemispheres on the plane of the equator, drawn by Mr.  
“Walker upon this principle, there are two magnetic poles re-  
“presented at different distances from the poles of the earth,  
“and revolving round the latter in unequal periods of time.  
“The north magnetic pole is placed for the year 1794 in lat.  
“71° N., long. 80 W.; the south magnetic pole in lat. 65° S.,  
“long. 130 E., and by the intersections of the magnetic meri-  
“dians with the terrestrial meridians, the variation of the nee-  
“dle might be found by inspection on these hemispheres for all  
“places on the surface of the globe, were the positions of the  
“magnetic poles well ascertained and correctly laid down, and  
“the needle not subject to aberrations from various causes al-  
“ready mentioned.

“But exclusive of the perpetual aberration of the needle  
“from permanent causes of nature, it is likewise subject to ad-  
“ventitious and local attractions, liable to operate in a consid-  
“erable degree against the accuracy of any theoretical solu-  
“tions.

“Mr. Churchman supposes the periodical revolution of the  
“north magnetic pole round the North Pole of the earth to be  
“1,096 years; and the revolution of the south magnetic pole  
“round the south terrestrial pole to be 2,289 years, its motion  
“being much slower than that of the north magnetic pole,  
“which is the cause of perpetual irregularities of the variation  
“of the needle. He is of opinion that when one of the magne-  
“tic poles is in the zenith of any place, magnetic tides or great  
“inundations will there be experienced; and when the magne-  
“tic pole is far distant from any place, the sea will recede, and  
“alluvial land will be formed. Mr. Walker, besides his dia-  
“gram for showing the horizontal declination of the needle, has  
“drawn two hemispheres on the plane of the equator, for shew-  
“ing the vertical declination or dip of the needle for all places  
“on the globe; and in addition to his improvements on steer-  
“ing-compasses, he has invented a meridional compass for  
“shewing the quantity of variation by inspection at any time  
“of the day.

“The celebrated Dr. Halley was of opinion that the varia-  
“tion and dip of the needle could not be resolved consistently,  
“on the supposition of the earth having only one magnetic  
“axis and two magnetic poles; and he inferred that two mag-  
“netic poles must exist in the northern hemisphere, and two  
“also in the southern hemisphere of the earth, in order to ac-  
“count for the discordant magnetic changes.



“ Professor Hausteen justly esteemed for his profound investigations of magnetical phenomena and for his researches in Siberia and other places to ascertain the magnetic influence and intensity, has discovered the existence of a magnetic pole in that country, Siberia, which leaves no doubt that there are two magnetic poles in the northern hemispheres: and as the late expeditions of our enterprising navigators have proved the existence of another magnetic pole in lat.  $70^{\circ} 5\frac{1}{2}$  N., long.  $96^{\circ} 46\frac{1}{2}$  W., by the observations of Captain Jas. Clarke Ross, Dr. Halley’s inference seems to have been correct, and may soon be demonstrated by similar researches in the southern hemisphere, where the existence of two magnetic poles will probably be discovered.

“ According to the recent researches of Professor Hausteen, the earth has four magnetic poles, all revolving in the neighbourhood of the geographical poles; and the periods of these revolutions are respectively about 4,600, 1,740, 1,800 and 860 years. These times, though long, as historical periods, are short compared with many of those cycles of which geological researches and astronomical calculations seem to prove the existence.

Müller-Pouillet informs us in his popular work on cosmic physics, that there are two foci of magnetic intensity in the northern hemisphere; one in northern Asia; and a stronger one in North America; but the magnetic poles where the inclination needle stands vertical and towards which the declination needle points, is not remarkable as a focus of greatest magnetic intensity.

In the Admiralty Manual for the deviation of the compass 8rd edition, London 1874, page 102, it is stated, “ in the northern hemisphere there are two such foci; and it is believed there are two corresponding in the southern hemisphere. These foci of magnetic force are of unequal strength; in the northern hemisphere, the strongest or the American focus, lies to the S. W. of Hudson Bay near the great system of the North American lakes; the weaker or the Siberian focus may be assumed as in lat.  $70^{\circ}$  N., long.  $120^{\circ}$  E. In the southern hemisphere the position of the stronger focus may be assumed in lat.  $70^{\circ}$  S., long.  $145^{\circ}$  E., and the weaker is probably in lat.  $50^{\circ}$  S., long.  $130^{\circ}$  E.”

Leaving out the probabilities and what is believed and what may be assumed concerning the southern hemisphere and dealing with the better established facts in the northern one only, the truth appears to be the following:—Hausteen, Halley,

Churchman, Walker and others by assuming more than one magnetic axis and more than two magnetic poles, have created a greater complication of the phenomenon than really exists, and trying to dissolve the mysteries of these self-created perplexities by elaborate calculations, they have arrived at more or less erroneous results.

I am confident if the cause of one of the magnetic foci in the northern hemisphere were to disappear suddenly, then what is now the magnetic north pole, would vanish just as suddenly and the remaining magnetic focus would become the magnetic north pole, for the following reasons: one magnetic focus prevents the needle from pointing in the direction of the other focus, but forces it in line with the diagonal of the parallelogram of magnetic forces towards the place designated as magnetic north pole; the same is the case with the inclination needle; each magnetic focus prevents it from being perpendicular at the other, and where it really does stand perpendicular, again is the magnetic north pole fixed by the parallelogram of forces of both magnetic foci. This magnetic pole naturally must be in line between the two foci of magnetic intensity, nearer to the stronger than to the weaker,—in this case, nearest to the American focus, which is in reality the case. From the preceding it will be seen that it hardly would be surprising, if earlier writers on this subject had assumed three magnetic axis, and half a dozen magnetic poles, rendering thereby the aspect of the whole phenomenon still more intricate. However the object of these lines is not to criticise my predecessors, but to advocate and of course submit to criticism my own views.

From a remark by General Sabini (Mrs. Somerville's *Connection of Physical Sciences*, Section XXX) it appears that Captain Ross has not been exactly at the magnetic north pole; "the spot where Captain Ross observed the needle so nearly vertical in 1881 marks the approximate position of that locality at that epoch."

The fact is no doubt as I have stated, that the magnetic pole is no fixed spot of a certain small extension, but constantly fluctuating, of diurnal and secular change,—moving in an epicycloidal track round the geographical poles.

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## 2.—*On the Nature of Foci of Terrestrial Magnetism.*

It will be recollected from the 4th Chapter of the essay on Periodical Change that by the combined efforts of the earth's re-



volution and the attraction of the sun upon the earth's protuberance at the equator (owing to our planets spheroidal shape) an elliptic current round the terrestrial magnetic nucleus was supposed to be created which, if seen from the magnetic equator, would represent a flat oval figure with its greater length in the direction of magnetic axis; if viewed from the magnetic north pole it would also represent an oval shape, the thinner end towards the axis of the earth's rotation; the whole perhaps would have a somewhat twisted appearance, owing to the fact, that during the winter solstice the nutatory circulation current would be accelerated in the northern hemisphere, on account of the sun's greater attraction in perihelion, tending to elevate more the northern half of the axis of rotation at a right angle with the plane of the ecliptic, than the southern half during the summer solstice, because of the sun's lesser attraction in aphelion. This would indeed let it appear possible that the northern magnetic pole might revolve faster round the globe than the southern one, as Mr. Walker and others seem to have supposed.

The foci of the ecliptic current as viewed from the North Pole would in all probability be corresponding to the foci of Terrestrial Magnetism upon the surface of the northern hemisphere. This idea receives confirmation, if we inspect the charts by Captain Duperrey, of the French Navy, in which he lays down in horizontal projection the isodynamic lines round the point of intersection of the meridian of Paris with the parallels of  $60^{\circ}$  N. and S. latitudes; the same idea is conveyed by the inspection of the charts of the magnetic meridians and parallel curves in polar projection by the same officer; and since from the preceding chapter we have seen that the magnetic axis of the earth depends upon the relative positions of the magnetic foci to one another, then it will become more easy to understand how the apparent irregular fluctuations of diurnal variation are brought about; the sun and moon passing together or separately once over the astronomical meridian of every individual focus of intensity, and once over the meridian  $180^{\circ}$  distant from it, would cause one lunar and one solar subterranean tide wave to pass twice in 24 hours over every one of the four supposed magnetic foci, except of course at spring tides, when lunar and solar tides become united into one, each tide wave would alter to a certain extent the momentary position of the respective focus, and would thereby affect the direction of the magnetic axis and of course the position of the magnetic pole, consequently also the variation of the needle. This theory would

account better for the changes of diurnal variation, than the resemblance of the isothermal curves with the isodynamic ones, because the former can be considered stationary for our purpose, while the latter do change. If it could be proved impossible to admit the quotidian displacement of our planets magnetic nucleus (by the sun's and moon's attraction), causing an independent circular motion of the same as pointed out in Chapter V of Periodical Change, then perhaps the idea demonstrated in this present chapter may also be found sufficient to account for all phenomena of diurnal variation; but considering that our whole globe is constantly kept off its mean orbit round the sun by gravitation and since it is consequently not the centre of the earth, which describes the mean orbit round the sun, but a certain point, which is the centre of gravity between earth and moon combined together (making the real track of the earth resemble the pitch of a screw propeller through the water), I believe it indeed possible, that the solid nucleus in the fluid interior of the earth under the influence of gravitation towards sun and moon may have an independent motion as described in Chapter V.

Could we from a magnetic focus on the surface of the earth see the currents of the interior, I think it likely that a rotatory motion would be noticed at each focus round an axis, connecting the focus in question with the corresponding one in the opposite hemisphere, and in the same direction, as the main circulatory current, with the sun.

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### 3.—*On the present shape of the Agonic Lines.*

THE simple relation between magnetic focus and pole as demonstrated, and its effect upon the magnetic needle is interfered with by two principal causes, if we disregard possible local attraction of Continents, thermal-electricity, &c., supposed by many competent authorities to influence the variation.

The first principal cause producing, what may be called a deviation of the declination needle from the magnetic meridian is best illustrated by the oasis of Western variation in China and Japan, and caused by the occurrence of the Siberian focus to the Northward and Westward of it; magnetic attraction, like gravitation, increases inversely, as the square of distance decreases, and the Siberian focus being nearer than either pole or other focus, it naturally deflects the North end of the needle in all places within this oasis of Western declination to the

Westward; and again places in the Northern hemisphere immediately to the Westward of this oasis (which indeed ought to have Westerly variation, if the needle were allowed to point to the Magnetic North Pole), shew Easterly variation, because the nearest focus of magnetic intensity (the Siberian one) is to the Northward and Eastward of them. Now supposing the system of magnetic lines to revolve with the magnetic poles from East to West, this repeated change of secular variation from West to East and *vice versâ*, several times over again at the places in the track of this peculiar insula of Western variation would make upon an observer the fallacious impression, that the Magnetic North Pole were moving occasionally in opposite directions; but in fact it proves only, how the plurality of magnetic foci may cause contradictory irregularities in the arrangement of Isogonic lines.

The second principal cause of deviation of the needle from the direction towards the nearest magnetic pole is the existence of the second magnetic pole in the other hemisphere, tending to draw the opposite end of the needle towards itself, to make it parallel with the magnetic axis, *which coincides nowhere* with the axis of the earth; this is well shewn by the shape of the Agonic line passing through America; the difference of longitude between the North and South Pole across the Pacific being only about  $110^{\circ}$ , the South end of the needle anywhere to the Southward of the Magnetic North Pole and near its meridian having the Magnetic South Pole at its left (when looking towards the centre of the earth), is drawn in that direction, the more, the further to the Southward, and as a matter of course the North end of the needle deviates just as much to the right, or the Eastward, causing the whole Agonic line in that part of the world to encroach upon certain regions of our globe, which otherwise would have Westerly variation; the same effect of the South Pole upon the needle's South end can be proved along the Southern part of the Agonic line passing through Australia; the meridians of the two Magnetic Poles across the Pacific again are only  $110^{\circ}$  of longitude apart, but *viâ* the Indian Ocean and the Atlantic they are about  $250^{\circ}$  difference of longitude apart; the consequence is, that the South end of the needle is drawn in the nearest direction towards the Magnetic South Pole, in this case to the right, or Eastward; the North end of the needle must deviate just as much to the left, or Westward, causing in the Southern hemisphere an inroad of Westerly variation into regions, where otherwise Easterly variation ought to be.



Assuming, that Hausteen and Walker were correct in letting the Magnetic North Pole revolve faster than the Southern one, then during one revolution, the former would be once on the meridian of the latter, and once  $180^\circ$  from it; in both cases the geographical meridian would coincide with the line of no variation, and the Eastern and Western variations would be equally divided, as stated in a previous chapter. These supposed unequal motions of the two magnetic poles would cause alternately contortions and distortions of the magnetic axis, and then periodical changes of the geographical latitude of the magnetic poles might presumably also take place.

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#### 4.—*Tidal Motion and Diurnal Variation.*

IN order to form an idea how the position of the magnetic foci and poles may be affected by the influence of subterranean tidal movements, besides the mere perpendicular tide wave, it is necessary to have before our mental eyes clearly our knowledge of oceanic tide waves, because it is reasonable to suppose that the one must behave analogue to the other.

It is not my intention to reproduce in this chapter what may be read in every good work on tides; but I wish to draw attention to a fact which appears to have been overlooked at least by those writers, whose works I have had an opportunity to consult; I cannot illustrate better what I mean than by making a few extracts from a couple of nautical works. First from the China Sea Directory, Vol. III, 1874, page 350 and 351:—

“The tidal streams at the entrances of the Yangtze from Gutzlaff to Shaweishan rotate, performing one revolution (with the sun) in 12 hours. To the southward of Gutzlaff the tides are also rotatory, but not with that regularity which is observed about the Amherst Rocks. There is also reason to believe, although the fact has not yet been conclusively established, that they preserve the same character some distance to seaward, and far to the northward. During its revolution the direction of the stream changes about two points every hour, excepting when veering from N. W. to N. E. about the time of high water, and from S. E. to S. W. about the time of low water, when the change is more rapid. The northern stream for the most part makes and completes the flood, and the southern stream for the most part makes and completes the ebb, although the first part of the flood is made

"by the southern stream, and the first part of the ebb by the northern, called sometimes "tide and half tide."

"Mr. G. B. F. Swain, master of H. M. S. *Pilot*, 1850, states that the revolving tide has been noticed as far out as the Saddle Islands, whilst others assert that the stream when fully made sets N. W. by W. and S. E. by E. These statements are not contradictory. Lieut. C. Bullock, R.N., found the tides to rotate, 120 miles north of the entrance, at 70 miles from the land."

Captain Horsburgh gives in his *India Directory*, Vol. I, page 599, the following table concerning tidal motions off the river Hoogly, when uninfluenced by the wind :—

" 1st quarter flood	N. W. by W.
" 2nd    ,,        ,,	N. N. W.
" 3rd    ,,        ,,	N. N. E.
" Last   ,,        ,,	E. N. E.
" 1st quarter ebb	S. E. by E.
" 2nd    ,,        ,,	S. S. E.
" 3rd    ,,        ,,	S. by W.
" Last   ,,        ,,	S. W. and W. S. W."

This is a complete revolution (with the sun), in the bay of Bengal, the same as off the Yangtsze.

Lately I have heard that "divers" engaged in salving operations in the vicinity of the Lammock Islands (Formosa Channel), have also observed a rotation of tides in that locality. From personal experience I am able to add the following fact:

In the summer of 1874, when commanding the British barque *Charley* of Hongkong, I was becalmed for several days during a voyage from Japan to Shanghai; to judge by the lead, the currents appeared very unsteady, setting at different times in different directions. I had good observations and found that I was drifting away towards the Strait of Corea, which set I attributed to part of the Japan stream (Kurosiwo current), branching off in that direction; determined not to lose more ground than could be helped, I brought up with the stream anchor on the great Yangtsze bank, about half way between Quelpart and the Saddle Islands in 23 fathoms. Remaining there some time for want of wind, I was much surprised to find the tides rotate with the same regularity as off the Yangtsze (with the sun), which accounted for the seeming irregularities of currents, indicated when consulting soundings only.

By these facts I am led to believe that tidal motion (if not



interfered with by the shape of neighbouring continents and Islands or Galeses), in the northern hemisphere always takes place from north, through east by south and west; in the southern hemisphere of course in the opposite direction; to verify this latter supposition the information contained in the 7th edition of Horsburgh is not sufficient; generally the establishment of the port and the rise and fall are only given for most places in the southern hemisphere; but I am confirmed in my opinion by much, what Horsburgh relates of equatorial regions. In the second volume of the India Directory he says on page 759 about Sourabaya Strait:—"Ships are sometimes detained upon the bank, or at the entrance of the channel, by the singular tides which prevail there, and for which science has not yet been able to account, or the pilots even to reduce to rule. In the chart of the channels leading to Sourabaya, by Lieut. M. H. Jansen, D.R.N., the depths are given at low water, and the following remarks are made on the tides:—"During the months in which the sun is on or near the equator, *i. e.*, in March, April, September and October, there are in this channel, at the full and change, two tides in 24 hours; but at the quarter moon's, as well as during all the other months, there is only one tide, and it makes low water in the night with south declination, and in the day when the sun has north declination.

"The greatest rise and fall of spring tides is 6 feet, and it occurs only in those months when there is but one high water in the 24 hours, and 3 or 4 days after full and change. The least rise and fall is 4 feet, and this takes place at the full and change also, but only in the months when there are the two tides, which may be regarded as a change for the day-high-water to the night-high-water, and vice versa. At the quarter moons of these months the water rises 5 feet, and in every other month  $5\frac{1}{2}$  feet above the depths marked in this chart.

"In the month of May it is high water between  $21\frac{1}{2}$  h. and  $0\frac{1}{2}$  h.; June, 20 h. and  $0\frac{1}{2}$  h.; July, 19 h. and 0 h.; August, 16 h. and 0 h.; November, 10 h. and  $12\frac{1}{2}$  h.; December, 8 h. and 12 h.; January, 8 h. and 12 h.; February, 7 h. and 12 h.

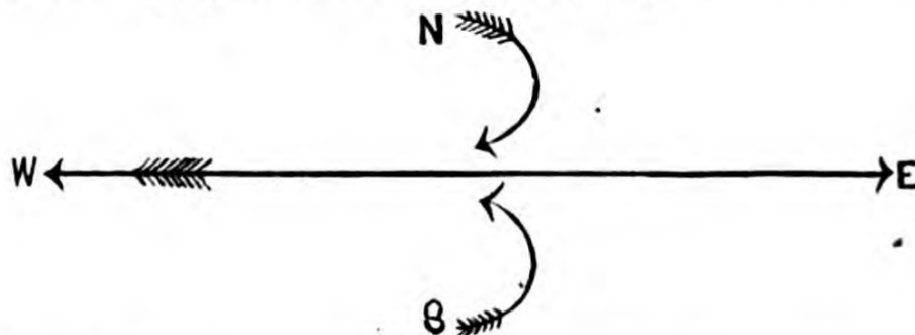
"At the spring tides, as well as at the quarter moons, it is high water always at  $10\frac{1}{2}$  h. or  $22\frac{1}{2}$  h.

"During the months when the two tides occur, it is also high water at  $10\frac{1}{2}$  h. and  $22\frac{1}{2}$  h. These two tides are, however, different in height; and when the sun's declination is north, the morning tide is the highest; but when it is south,

"the evening tide. In those the quarters which give but one tide,(1) give the higher water as at full and change."

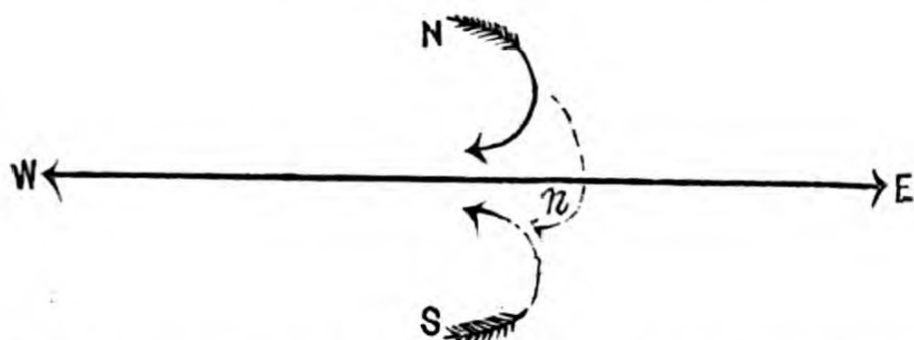
Now I believe that during the sun's northern declination the tides in Sourabaya Strait do rotate the opposite way, as off the Yangtsze; during his southern declination the tides are also rotatory, but the same way as the Yangtsze tides. During the two equinoxes then it will be difficult for local pilots even "to reduce the tides to rule," because the tides changing from one rotation *i. e.* with the sun, to the other, *i. e.* against the sun, or vice versa, may appear to become to a certain extent confused and irregular.

I will not transgress too much by recording more instances of apparently irregular tides, as I could; but refer for one remarkable instance more to page 737 of the same volume of Horsburgh's, concerning Pitt Strait, where several vessels by the tides setting consecutively in "all directions" running considerable danger: I believe, if they could have anchored they would, (as I did on the Yangtsze bank in 1874) have experienced a rotary regular tide, perhaps at springs:—



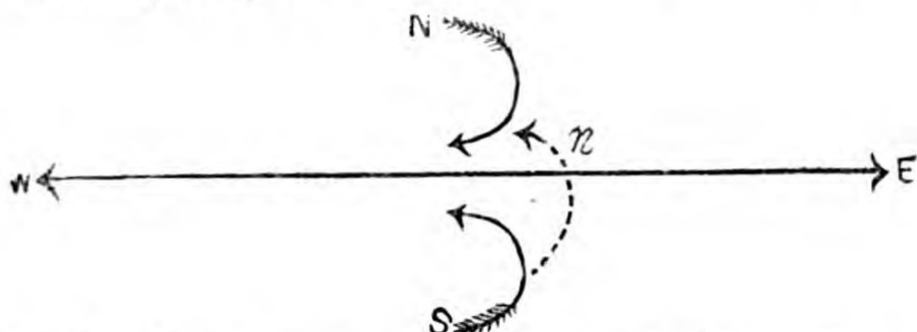
W E is the equator, the curved arrow N indicates the rotation of tides in the northern hemisphere, the curved arrow S shews the same in the southern hemisphere; supposing the straight arrow at W to point out the direction of the flood tide on or near the equator, then the flood and ebb currents will occur at the same time on both sides of the equator, and places near it will have two regular tidal revolutions in 24 hours. At neaps the flood wave resulting from the moon's lower meridian passage becomes so much counteracted by the sun in quadrature, that it is scarcely noticeable, or incapable to overcome the *vis inertiae* of tidal motion, resulting from the moon's upper meridian passage; then places like Sourabaya Strait will only experience one flood and one ebb in 24 hours.

(1) Horsburgh's tidal account of Banca Strait resembles in many points that given of Sourabaya Strait.



During the sun's southern declination the northern currents stretches over across the equator and arrives retarded at N, continuing the southern already finished flood stream for another 6 hours; a singular phenomenon occurs with the ebb stream, thereby allowing only the effects of the upper meridian passage to appear as one flood and one ebb in 24 hours.

The seeming irregularities of tides must be greatly increased by the circumstance of the principal factor in their production, *i. e.* the moon, crossing and recrossing the equator so many times during the year:—



In the above figure W E is the equator during the sun's northern declination; the stream from the southern hemisphere crosses the equator to the northward in the direction of the curved arrow S N and continues the spent tidal movement in the northern hemisphere similarly as in the preceding case; the consequence is the same; one complete tidal rotation in 24 hours only.

If this view of oceanic tidal motion can be accepted, then it is natural to suppose that the earth's internal fiery ocean must be equally or rather more so affected; being as many miles perhaps in depth, as the briny outside ocean is fathoms only: and then it would be easily understood that the magnetic foci and poles by being carried along with the tidal motion would cause a change of the magnetic axis in the same manner, as if the earth's magnetic nucleus were moving, as described in a

previous chapter; tidal motion or displacement of magnetic nucleus would have the same effect: change of axis of our planets magnetic internal apparatus, and thereby producing the main features of annual and diurnal variation, many seeming irregularities being the result of the unsymetric distribution of magnetic foci and poles, and the consequent eccentricity of magnetic axis. My attention has been called to Humboldt's Kosmos, vol. IV, Stuttgart and Tübingen, 1858 ("Specielle Ergebnisse der Beobachtung in dem Gebiete tellurischer Erscheinungen"), in which much valuable information is contained concerning Terrestrial Magnetism.

Humboldt states (p. 53) that the Chinese, Indian, Arabian, and Malay navigators knew the magnetic variation before Columbus; in fact Andrea Bianca had entered it on his sea charts in 1486; what Columbus did discover is the line of no variation, passing then  $2\frac{1}{2}^{\circ}$  east of the Azoric Island, Corvo, and I think what the Spanish savants, according to Commander Walker, refused to credit, may have been Columbus' statement, that to the westward of his newly discovered line of no variation the variation were opposite (westerly) to what at his time it must have been in Spain (easterly.)

Commander Walker gives as his source of information the Encyclopaedia Britannica.

According to the Kosmos it seems, that generally all magnetic elements have two daily maxima and two minima; for fuller particulars I must refer the reader to Humboldt's work; on page 97, however, I find it mentioned according to Sabine, that the diurnal variation of intensity at Van Dieman's Land (Hobart Town) shews only one maximum and one minimum per diem; and referring to Horsburgh's India Directory, Vol. II, page 839, I find the following tidal information about d'Entrecasteaux Channel (Van Dieman's Land): "the rise of the tide which flowed only once in 24 hours was about 6 feet perpendicular; high water from 9 to 12 hours at full and change, etc;" this is a remarkable coincidence with only one daily maximum and one minimum of magnetic intensity, which I consider may be a proof of also one subterraneous tidal revolution only in 24 hours.(2)

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(2) Humboldt on page 84 (Kosmos, Vol. IV.) calls attention to a zone of weak intensity between the northern and southern magnetic hemispheres, which alternately shares the magnetic movements of the opposite hemispheres during opposite seasons, similar as I suppose a corresponding zone in the same regions, partaking alternately of the tidal rotation of each hemisphere, as governed by the declination of the sun.



Humboldt asks (on page 141) if the line of no variation, which Columbus found near the Azores in 1492 is the same that Davis and Kieling in 1607 found at the Cape of Good Hope? I think not; Columbus's Azoric line must be the one, which now passes through the sea of Ochotsk, the Kurile Islands and to the eastward of Japan; and Davis's and Kieling's line must be the one, which Müller and Pouillet in 1663 passed through Paris (according to Picard in 1666), and which runs now through North America and the South Atlantic.

According to Graham (the same volume of the *Kosmos*, page 189, *Philos. Trans.* for 1724-25), the variation of declination depends "neither upon heat nor cold, dry or moist air. The variation is greatest between 12 and 4 in the afternoon, and the least at 6 or 7 in the evening." To this Humboldt makes the remark "es sind freilich nicht die wahren wendestunden," "(but these are not the true turning hours)"; I believe Humboldt is wronging Graham, who for his time may have given the true turning hours correctly, which may change with the revolving position of the magnetic poles.

In more than one place Humboldt states his opinion that temperature has nothing to do with periodical variation, and on page 192 he quotes Relshuber (translated as follows):—"there are two maxima and two minima of declination in 24 hours, but only one maximum and one minimum of temperature." At pages 176 and 177 Humboldt quotes from Sabine:—"The turning periods of the year are not, as many might be supposed to anticipate, those months in which the temperature at the surface of our planet, or of the subsoil, or of the atmosphere attains its maximum and minimum. The annual variation is obviously connected with and dependent on the earth's position in its orbit relatively to the sun, around which it revolves; as the diurnal variation is connected with and dependent on the rotation of the earth on its axis. It is a remarkable fact, which has been established, that the magnetic force is greater in both hemispheres in the month of December, January and February, when the sun is nearest to the earth, than in those of May, June and July, when he is most distant from it; whereas if the effects were due to temperature, the two hemispheres should be oppositely instead of similarly effected in each of the two periods referred to.

From page 82 the following is a translation:—"The principal result of researches on the magnetic influence of the earth's satellite, which according to Melloni, only shews a



"trace of heat generation, is that the magnetic declination upon our earth in the course of a lunar day suffers a regular change, arriving twice at a maximum and twice at a minimum. If the moon, says Kreil very properly, produce no change of temperature upon the surface of the earth, recognisable by common thermometers, then she can produce no alteration of Terrestrial Magnetism by this means; if in spite of this such an influence is observed, it must be concluded, that it is "brought about by other means, than heat." This other means, I repeat it, can only be the same, which produces oceanic tides.

Humboldt says on page 189 (translation): "compare extracts of a letter from me to Karsten, Rome, 22nd June 1805, on 4 motions of the magnetic needle, comparable to 4 magnetic ebb and flood tides, analogue to the barometric periods, etc."

A proof that during perihelion motion and commotion in the interior of the earth by the greater attraction of the sun must increase, is the rise of temperature in the Schergin shaft of Siberia, sunk 382 Parisian feet into the frozen ground; I translate the following from page 168:—"A remarkable and hitherto unexplained phenomenon is the rise of temperature, which in winter sometimes has been noticed in the deeper parts only, without any traceable influence from the outside."

Since the sun's greater attraction during perihelion accelerates the motion of the earth in its orbit, why should it not also increase the velocity (intensity) of the subterraneous circulatory current? and since greater motion in the earth's interior must manifest itself by a greater production of heat, we have an explanation of the phenomenon in the Schergin shaft: a translation (transformation) of the sun's greater attraction during perihelion into heat. Another direct proof of increased internal motion during perihelion. I translate from page 296: "The activity of the "Stromboll," (volcanse) is like that of the "Aetna, greatest in November and during the winter months," *i. e.* during perihelion.

Humboldt states on page 488 that Poisson, with whom he conversed several times about subterraneous tides, thought them to be inconsiderable, and Humboldt's astronomical friend Dr. Brünnout expressed himself that internal tides could just as little take place on account of our planet's solid crust, as in the ocean, if the latter were covered with an unbreakable sheet of ice; but Ampere said that owing to the action of the moon on the enormous internal liquid mass, tides would result analogue to those of our seas, but much more terrible ("mais bien

"autrement terribles"), on account of the larger extent and greater density of the mass, it would be difficult to conceive how the shell of the earth could resist, being constantly battered by a kind of hydraulic ballista ("étant incessamment battue par une espèce de béliet hydraulique (?) de 1400 lieues de profondeur").

To these various ideas I can only again repeat from Mr. Kingsmill's *Border Land of Geology and History*, page 5:—"If the interior of the earth were liquid and its crust composed of so rigid a material as steel, and 300 miles thick, it would yield to the deforming influences of centrifugal force and the attraction of the sun and moon as if it were india-rubber."

Considering all, it seems that opinions on these subjects differ widely; or to use a German proverb: "Darüber sind die Gelehrten noch nicht einig."

To my mind there remains, no doubt, that the force of those celestial bodies which cause the nutation of our planets' axis of rotation and the precession of the equinoctial points, also do cause in the movable fluid interior of the earth those movements, which I have endeavoured approximately to picture.

Biot, Haughton and others appear to have the idea of a magnetic nucleus before me; Humboldt objects strongly to Halley's views on this subject, but Halley placed his nucleus in a hollow terrestrial shell, while I take the *dense* state of our planets' interior into due account (see Bohn's edition of Humboldt's *Cosmos*, Vol. I, p. 163). Adhemar states concerning Bertrand of Hamburg: "Il supposait, que la terre était creuse et qu'il y avait dans son intérieur un gros noyau d'aimant," etc. (Croll's *Climate and Time*, p. 543.) I was unacquainted with these elder ideas, when I occupied myself first with the same question.

*Note.*—In Amadée Guillemin's "The Heavens," edited by Norman Lockyer and revised by Richard A. Proctor, the latter gentleman writes on page 391, after the current and generally accepted explanation of tidal phenomena is given: "It must be noted, however, that although the statistical equilibrium of a tidal wave is thus accounted for, the dynamical conditions of the problem cannot be thus explained. On the contrary, if we consider only the dynamical rotations, we shall find that the place of low water should be under the moon and at the opposite part of the earth, the place of highwater between these regions. Newton, Laplace, Airy and others agree in this view. The theory of the tides remains yet to be established satisfactorily. Much that has been presented in

"popular treatises as part of this theory is in reality but an account of the results of observation.

"On the 1st of September, 1859 two astronomers, Messrs. Carrington and Hodgson, were independently observing a spot, when they noticed a very bright star of light suddenly break out over it, moving with great velocity over the sun's surface. At the same moment the magnetograph at Kew, where all the changes in the earth's magnetism unceasingly register themselves, was violently affected."—(Amadée Guillemin's "The Heavens," London, M, DCCC, LXXVI, page 52.)

### 5.—Possible Origin of Magnetism.

To understand the nature of magnetism, it is essential to recollect that more substances than iron, steel, nickel, cobalt and so forth, are magnetic.

Sir W. S. Harris, in his paper on the transient magnetic state of which various substances are susceptible has given the following table of the comparative magnetic inductive susceptibility of the following substances:—

Metals, &c.	Rolled Silver.	Rolled Copper.	Cast Copper.	Rolled Gold.	Cast Zinc.	Cast Tin.	Cast Lead.	Solid Mercury.	Fluid Mercury.	Cast Antimony.	Cast Bismuth.	Glass.	Marble.	Mahogany.	Water.
Comparative magnetic energy ..	39	29	20	16	10	6.9	3.7	2	1	1.3	1	0.35	0.37	0.37	0.27

Sir W. S. Harris found that by condensing the metals their magnetic energy was increased (Commander W. Walker's repeatedly quoted work "The Magnetism of Ships," page 17). From this table it will be seen that solid (which can only mean frozen) mercury is 100 per cent more capable of magnetism than the fluid mercury; but in solid mercury the molecules must be closed together than in the fluid, because the former comprises a smaller compass than the latter, and since we know that the attraction of bodies increases inversely as the square of the distance decreases, what possible reason could there be to suppose that the attraction between molecules should not increase at the same rate, should not obey the same law, if the body which they constitute does contract; in other words, when they are brought nearer to one another within the body? Now, if under ordinary circumstances this special



form of gravitation, the molecular affinity, is sufficient to keep the bodies together in their ordinary aggregate state, what must be the consequence, if by excessive pressure or by contraction a surplus of affinity is created more than is required for the existence of the body under ordinary circumstances? Nothing is more natural than that this surplus of disengaged affinity should make its presence known under some form or other, for instance, as magnetism; this is therefore an explanation for the increased magnetic capacity in solidified mercury. We may then say: by increased density of bodies magnetism is generated; iron is an instance when by some mechanical process (external superior force) converted into the denser steel.

If a magnet is heated, magnetism is lost, because it must be reconverted into original affinity to counteract the increasing centrifugal heat vibrations of the molecules.

In soft iron (says Mr. Merrifield in his severally cited work "Magnetism, etc., page 29) "where the magnetism must be induced, the power increases with a rise of temperature to a blood red heat. With other magnetical substances, as cobalt and nickel, the effects of heat vary; and Faraday shewed that some substances which at ordinary temperatures are not magnetic, become so when exposed to intense cold."

This case of iron becoming more capable of magnetism until heated to a certain degree is one of those exceptions which proverbially prove rules; for Tyndall states in "The Forms of Water," page 124: "Water is not a solitary exception to an otherwise general law. Heat expands, cold contracts, there are other molecules than those of this liquid which require more room in the solid crystalline condition than in the adjacent molten condition. Iron is a case in point. Solid iron floats upon molten iron exactly as ice floats upon water. Bismuth is a still more impressive case, and we could shiver a bomb as certainly by the solidification of bismuth as by that of water." This shews that iron passing from the solid to the molten state at certain degrees of heat must be contracting, thereby disengaging a certain amount of molecular affinity, manifesting itself as increased magnetic capacity. Having these facts (which I cannot express better than saying that by increased density of bodies capable of magnetism a certain amount of spare affinity must appear under the form of magnetism), vividly before our eyes, then it will easily be understood how terrestrial magnetism originated, if we throw a hurried glance at the earliest history of our planet.

"Supposing with Helmholtz that the sun originally existed  
 "as a nebulous mass, filling the entire space presently occu-  
 "pied by the solar system and extending into space indefinite-  
 "ly beyond the outermost planet."—(Croll's *Climate and Time*,  
 page 348.)

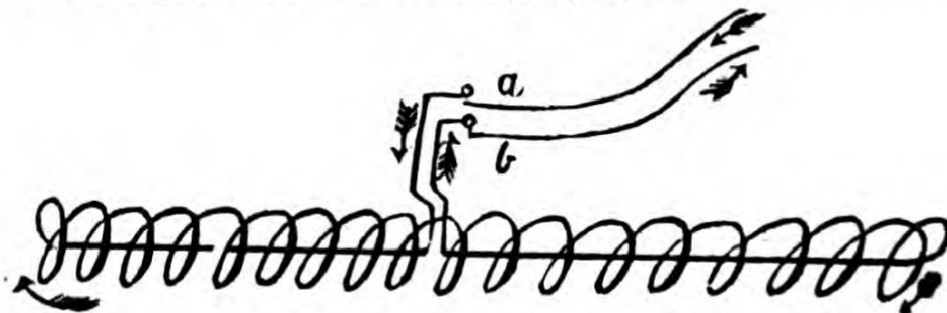
And supposing this nebulous matter sufficiently contracted,  
 that at the outer limit or surface, mass after mass had detached  
 itself from the parent body, forming successively the outer pla-  
 nets with their satellites, until our own planet was formed.

Suppose  $x$  million of years ago the diameter of the earth's  
 body had been 10,000,000 miles, and the attraction between two  
 neighbouring molecules  $=m$ , then  $y$  millions of years afterwards  
 the diameter having contracted to 100,000 miles, the attraction  
 between two neighbouring molecules must have been  $100^2m$ ,  
 or 10,000 times greater; part of this increased power of gravi-  
 tation must have manifested itself as telluric magnetism, the  
 rest being radiated into space as heat.

It will be seen that I am trying to trace magnetism home to  
 gravitation; in the following chapter some more weighty rea-  
 sons will be produced to support this view; at present a few  
 remarks concerning the analogy between magnetism and elec-  
 tricity may not be out of place.

This essay not being intended for a lesson in elementary phy-  
 sics, the reader is supposed to be sufficiently conversant with  
 the action of electricity upon magnets, or of magnets upon  
 electric currents, to understand the following deduction; but  
 being unable to express better what I should expound first, to  
 make the succeeding argument clearly understood, then it can  
 be found in "*Natural Philosophy*," translated and edited from  
 Gaout's *Cours Elementaire de Physique*, by E. Atkinson, Ph.D.,  
 F.C.S., 2nd edition, page 501.

"Structure of a solenoid.—A solenoid is a system of equal  
 "and parallel circular currents formed of the same pieces of  
 "covered copper wire, and coiled in the form of a helix or spi-  
 "ral, as represented in the accompanying figure:—





"A solenoid, however, is only complete when part of the wire passes in the direction of the axis in the interior of the helix.

"With this arrangement, when the circuit is suspended in the mercury cups of the apparatus, and a current is passed through, it is directed by the earth exactly as if it were a magnetic needle. If the solenoid be removed it will, after a few oscillations return, so that its axis is in the magnetic meridian. Further it will be found that in the lower half of the coils, of which the solenoid consists, the direction of the current is from east to west; in other words the current is descending on that side of the coil turned towards the east, and ascending on the west. In this experiment the solenoid is directed like a magnetic needle, and the north pole, as in magnets, is that end which points towards the north, and the south pole that which points towards the south."

"Mutual actions of magnets and solenoids.—Exactly the same phenomena of attraction and repulsion exists between solenoids and magnets as between magnets. For if to a movable solenoid traversed by a current, one of the poles of a magnet be presented, attraction or repulsion will take place, according as the poles of the magnet and of the solenoid are of contrary, or of the same name. The same phenomena take place when a solenoid, traversed by a current and held in the hand, is presented to a movable magnetic needle. Hence the law of attractions and repulsions applies exactly to the case of the mutual action of solenoids and of magnets,"

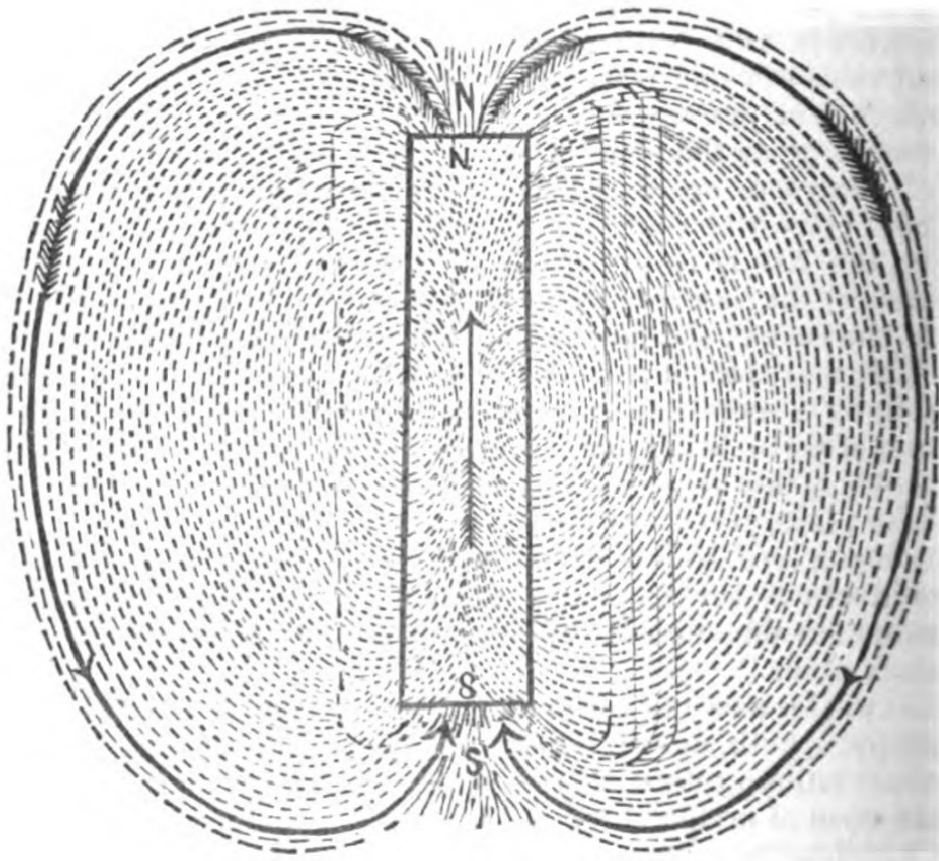
"Mutual actions of solenoids.—When two solenoids traversed by a powerful current are allowed to act on each other, one of them being held in the hand, and the other being movable about a vertical axis, attraction and repulsion will take place, just as in the case of two magnets. These phenomena are readily explained by reference to what has been said about the mutual actions of the currents, bearing in mind the direction of the currents in the ends presented to each other."

Now, if a house in all main features resembles a certain other building, both answering exactly the same purposes, then the second building must also be a house, though perhaps of another style of architecture and of different material; both must be constructed after a similar plan.

In the solenoid we see that a current traverses a wire in one direction and is conducted back spirally outside the wire beyond the opposite end, and led back again inside the spiral coil in the original direction.

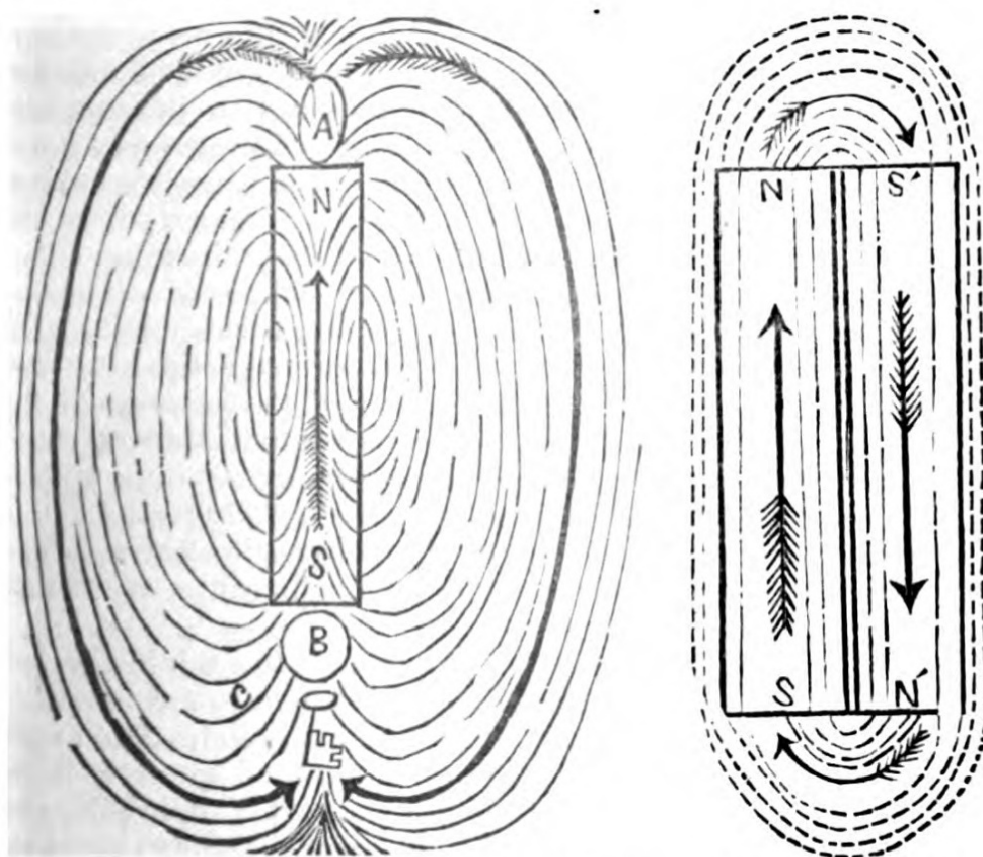
It must be the same case with the magnetic current, emanating from one pole and making its way back to the opposite pole, as best it may and as is well shewn by the familiar experiment: to cover a strong magnet by a sheet of paper and sieve iron filings on top of it; the iron filings, acted upon by the inductive currents, become arranged in regular curved filaments from one end to the other; in the centre, where the curves become so small as to neutralize one another, no action is observed; there is the magnetic equator.

That this current from pole to pole takes place can be conclusively shewn by introducing a strong horse shoe magnet into iron filings, or amongst nails, when at once solid bridges of filings or nails will be formed, connecting both poles in regular arches (compare Faraday "On the Various Forces of "Nature," pages 50 and 170.)



N S is a magnet; the current is supposed to emanate at N and enters again at S, a continuous circulation takes place, as in a solenoid.

Place some pieces of iron A, B and C (accompanying figure) near either pole; the current will traverse them, exciting at the same time the latent magnetism of the iron to join the original current and attracting the iron towards the foci of circulation, the poles, like invisible arms of apolype; add pieces of iron ad libitum, the effect would only be to prolongate the current but every piece would be traversed by it, and become a temporary magnet.



Place a second magnet S' N' with reversed poles alongside the former and the circulation selects the nearest and best conductor (like a streak of lightning in a similar case), and the pieces of iron become demagnetized by the desertion of the current, and drop down, being no longer attracted. Break either of the magnets in pieces, the circulation will continue in each piece, everyone becoming an independent magnet; a flash of lightning passing through a magnet contrary to the current will reverse it and of course the poles also.

Poles of the same name repel one another until the axis of the magnets are parallel to each other (if we disregard the influence of terrestrial magnetism), and opposite poles attract

each other, to form *one* continuous current; in both cases the magnetic currents obey the law to arrange themselves parallel to one another; even in the second case, where they have the tendency to form *one* straight line, because it cannot be denied that a straight line is parallel to itself.

The attentive reader will readily observe that by this simple theory all phenomena peculiar to magnets, without a single exception, can be satisfactorily accounted for, not having recourse to Ampère's somewhat complicated artificial theory and the hypothetical two fluids: Austral and Boreal.

According to this hypothesis the earth itself would be only the vehicle of a vast magnetic current, emanating in the antarctic regions and visible under favourable circumstances as Aurora Australis, spreading towards the equator and thence converging in regular curves towards the arctic regions, where frequently visible as Aurora Borealis. It would make no difference if the current were travelling in the opposite direction; I have only assumed the former circulation, because the southern hemisphere is believed to possess more magnetic intensity, some of which might be spent by the current's passage to the northward in meteorological phenomena (thunderstorms, etc.)

A tangent on either magnetic current curve in any place would probably be identic with the magnetic dip; might this magnetic current be the cause of atmospheric electricity and the returning current (through the earth) the cause of telluric electricity?

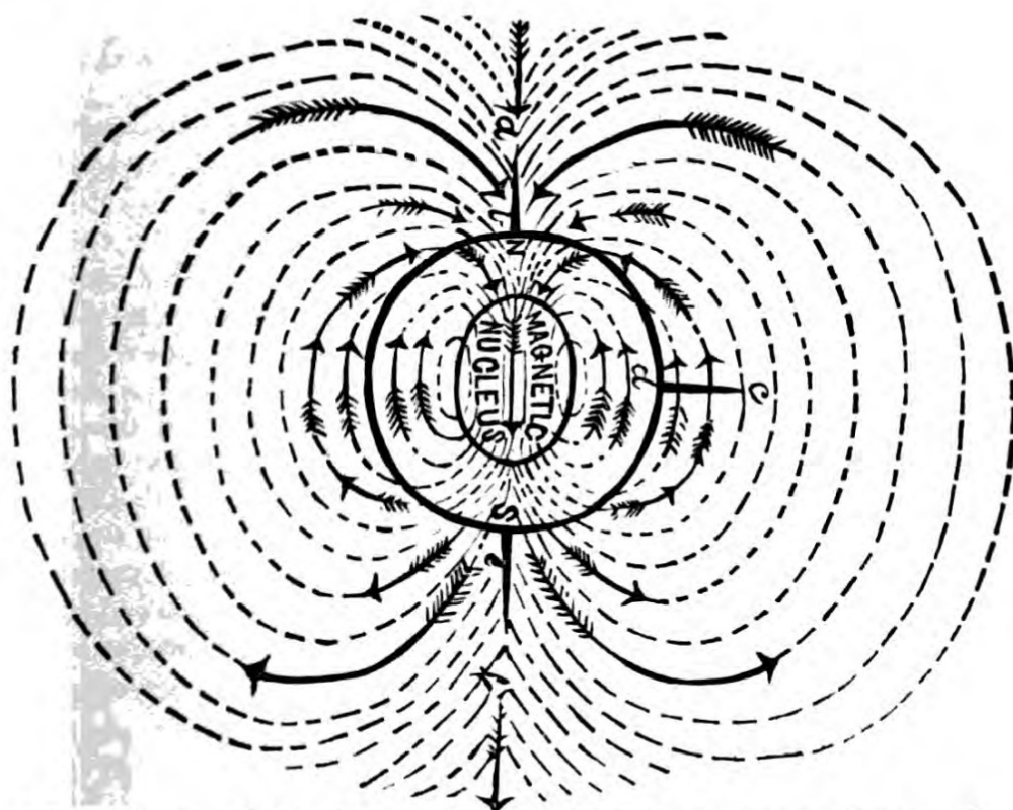
"Many hypothesis have been propounded to explain the origin of the atmospheric electricity. Some have ascribed it to be the friction of the air against the ground, some to the vegetation of plants, or the evaporation of water. Some again have compared the earth to a vast Voltaic pile, and others to a thermo-electrical apparatus. Many of these causes may, in fact, concur in producing the phenomena." —(Ganot's Cours élémentaire de Physique, by E. Atkinson, London, 1875, page 463.)

It would be interesting to know whether the motion of the earth's interior might be contributing to produce electricity; is it possible that the secular motion, the rotatory current and tidal action of our planets' fluid interior may produce electric currents, perhaps from east to west, according to Ampère's opinion?

The northern and southern lights probably are occurring in the highest parts of the atmosphere, where it begins to become very rarified, in analogy of the electric light in vacuo, or rari-



fied vapours (compare Ganot's Natural Philosophy, etc., etc.) page 525-526.



The above globe is the earth, N S is a magnetic north and south line; magnetic ethereal matter emanates in the southern hemisphere, probably in decentric undulations (from common centres), crosses the equator in the direction of the arrows and enters the northern hemisphere, probably in accentric undulations (towards common centres), to circulate back again through the body of the earth towards the antarctic regions, and so forth; *a b*, *c d* and *e f* represent iron masts at the poles and at the equator; they are traversed by magnetic induced currents, parallel to the nearest curves in the direction of the arrows; in the northern hemisphere *a* is the induced south pole; *b* the induced north pole of *a b*; in the southern hemisphere, *e* is a south pole and *f* a north pole of *e f* by induction from the earth; at the magnetic equator the induced magnetic current must be horizontally somewhere between *c* and *d*, like the arrow.

The arrows indicate the supposed direction of this magnetic current; the arrow heads present everywhere that end of the magnetic needle, which on the surface of the earth is the north seeking pole.



The tendency of all magnets below and above the surface of the earth must be to remain parallel to this terrestrial magnetic circulation, and if there were a tunnel through the earth from one magnetic pole to the other, then the direction of the needle at the *centre of the earth* would be opposite to what it is on the surface near the equator.

The reason of the terrestrial magnetic influence being so great in soft iron is no doubt due to this metal's great capacity for atomic polarity (compare Tyndall's "Atomic Poles" in the "*Forms of Water*," p. 32) the molecules arranging and disarranging themselves instantaneously, according to prevailing magnetic or electric currents; steel being harder, the molecules do not so easily give way; but when arranged in a manner most favourable to a current's passage, they are more likely to remain so (Coercive Force.) Consequent points in a magnet are due to faulty magnetisation; the bar being touched wrongly, currents in opposite directions are formed and consequently intermediate poles. When the pole of a weak magnet touches the same pole of a strong one, the current in the former may be reversed by the more powerful current of the stronger magnet in an opposite direction, and therefore also the poles of the weaker magnet would be reversed; lightning may cause the same effect.

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6.—*On the Coincidence of Periodical Maxima and Minima of Solar Spots with similar changes of Terrestrial Magnetic Variation.*

It is a fact well established by the labours of Schwabe, Wolf and others that in mean periods of about eleven years the number and size of solar spots are subject to gradual changes; while Sabine, Hornstein and Lamont very early discovered a parallelism between these changes and similar ones of the terrestrial magnetic elements; both increase during about  $5\frac{1}{2}$  years, when they attain their maxima and then decrease again until they attain their minima together; therefore it has been supposed by many competent authorities that terrestrial magnetism must be influenced by a maximum or minimum of solar spots. I think it more likely, that both phenomena are independent of one another, but since they do coincide, that they must be caused by the same means, for the following reasons: Considering solar spots first, we must bear in mind that the sun

is a fiery mass in the process of cooling, the same as the earth has been in former ages. The spots are products of this cooling process, partly in the solar atmosphere (solar vapours composed of various elements condensed to solar clouds); partly floating on the surface like floes of ice upon water; or in the case of the earth's earlier age, like what then must have been the first nuclei of the forming solid crust (now primary rocks?); these slakes given, they may burst by contraction, the fiery liquid springing up between the pieces, separating and flooding them, or the pieces perhaps may sink into the fiery deep below and become melted again, after which the radiation of heat into space (temporarily suppressed by the intervening spots), will be renewed with increased force. But it would be out of place to discuss here the various theories of solar spots; my object only is to remind that they are a product of a cooling process upon the sun; this cooling process can solely occur by radiation of heat from the sun's surface into space; therefore, if this process appears enhanced during about  $5\frac{1}{2}$  years, it is a direct proof that during this period the sun gradually becomes surrounded by a better heat conducting medium; this medium being the assumed allpervading universal ether, without the existence of which neither the phenomena of heat and light nor probably those of gravitation, magnetism, electricity, (and possibly those of sound) could not be explained. But since this heat conducting medium naturally must remain one and the same (the assumed ether), the change or improvement which takes place can only occur in its constitution, and I consider it possible, that during one-half of the 11 years' period its density may increase, during the other half it may decrease; during the dense ethereal periods the radiation from the sun becoming more intense, the superficial parts of the sun cool more rapidly and the maxima occur; during the rarified ethereal periods the radiation decreases, the sun's proper heat melts the products of the preceding accelerated cooling process more quickly than they can be replaced, and a minimum of spots occurs.

That during a maximum of solar spots a maximum of heat is radiated from the sun perhaps may be considered as proved by the discovery of Lockyer, that during a maximum period of solar spots the quantity of rain upon our planet is considerably more than during a minimum of spots; (compare "*Kosmologische Briefe von Hermann J. Klein, Graz 1877*," page 252); because more rain cannot fall, unless more water is previously evaporated from the sea; but more water cannot be evaporated, unless more heat is supplied by the sun, and more

heat cannot be conducted from the sun to the earth, without the capacity of the conductor, the ether being improved ; therefore the density of the ether must be subject to periodical changes corresponding to those of the solar spots, and how that is likely to effect terrestrial magnetism we shall see presently, but consider first, how this change of density possibly may happen.

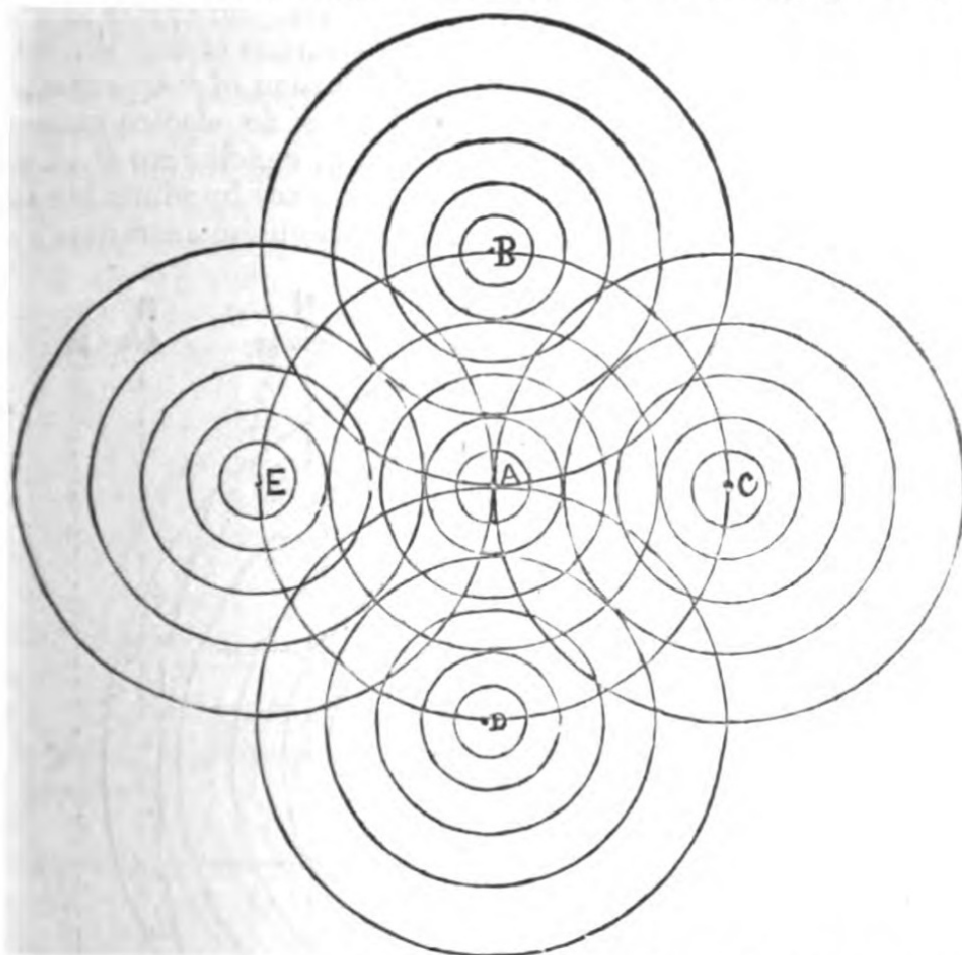
If our imagination and theories fill endless space, where everything is subject to eternal motion, with assumed universal ether, we have no right to suppose that it should not participate in the motion of the stellar systems ; and since all its known actions, as transmission of heat and light, are undulatory, then periodically ethereal waves of greater and lesser density may be sweeping through our planetary system, from worlds beyond and towards worlds beyond, perhaps analogue to swarms of meteorites, radiating in certain periods from certain points of the firmament ; this ether being possibly not only the element in which all stellar systems are moving, but also the element, the force, by which they are being moved ; for I think the possibility can be shown that the supposed ether may be the source of gravitation, the very thing which keeps the atoms of all matter near one another, leads or attracts them towards each other, and in solids, cements them together.

There is a high degree of probability that the ether filling the space of our solar system be moving round the sun in the same manner as the planets ; because if the space were filled by the bodies of the system in former ages (dissolved as we might say in ether), as nebulous mass, concentrating afterwards into the various celestial bodies *rotating round the sun in the same direction*, what inducement could the ether have to do anything else ?\* But ours is not the only solar system in space ; ours is surrounded by innumerable neighbouring ones, each possessing no doubt its own revolving ethereal atmosphere. Now, the ethereal undulations from one system must be traversing the undulations of the other systems ; because if not, we would simply not be aware at all of the existence of other worlds ; and that, when two or more crests of ethereal waves are co-existing (overlapping, superposing one another) in our solar system, the maximum influence of ether is manifested by increased radiation from the sun and consequently more considerable formation of solar spots and greater intensity of all terrestrial phenomena connected with the same pe-

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\* "Olbers maintained, that this fluid could not be at rest, but must "rotate directly round the sun." (Humboldt's Cosmos, vol. III, p. 48).

riod. But when the troughs of two or more ethereal waves occur together, then the intensity of all phenomena concerned will be less, analogue to the interference of light and other waves; this interference of ethereal waves would be acting on our system like bellows on a furnace, and from other stars possibly our sun might appear as a star of periodically variable light; or perhaps we may view our dense ethereal periods as the sum or accumulation of ethereal waves from the myriads of stars and nebulae in the milky way; or as waves overtaking or meeting the sun on his presumed passage through space. It may be remarked here that the mean periods of about 11 years are by no means very regular; (compare the tables in Dr. Klein's "Kosmologische Briefe," 2nd edition, page 220.)



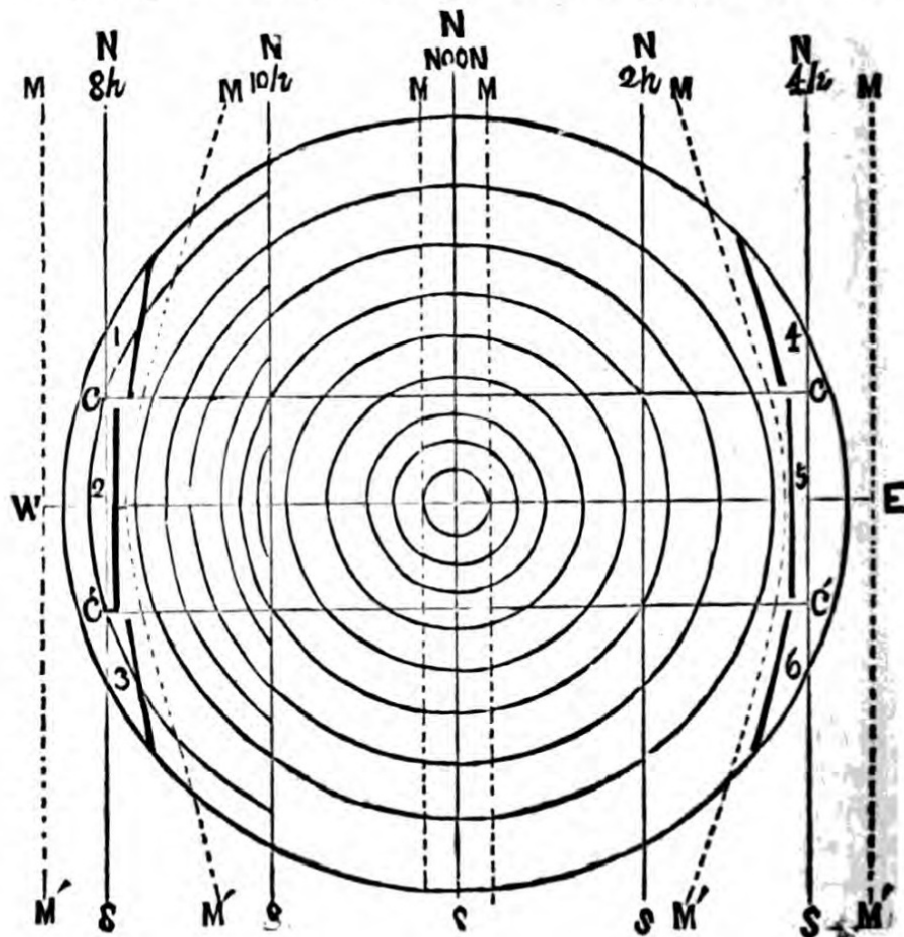
A is the solar system in space; B, C, D and E are to represent neighbouring stellar systems, and the circles ethereal undulation crests; where they coincide, maxima of density take place; where the intermediate spaces—the troughs—coincide, minima of density will happen.



How ethereal waves, therefore also maxima and minima of density, may affect the phenomena in question is well suggested by Alex. von Humboldt, in the English edition of his *Cosmos*, translated by E. C. Otté, London, 1868, Vol. III, pages 39 and 40 :—

“The numerous investigations that have been made in recent times regarding the intimate relation between light, heat, electricity, and magnetism, render it far from improbable that as the transverse vibrations of the ether which fills the regions of space give rise to the phenomena of light, the thermal and electro magnetic phenomena may likewise have their origin in analogous kinds of motion (currents). It is reserved for future ages to make great discoveries in reference to these subjects.” . . . . .

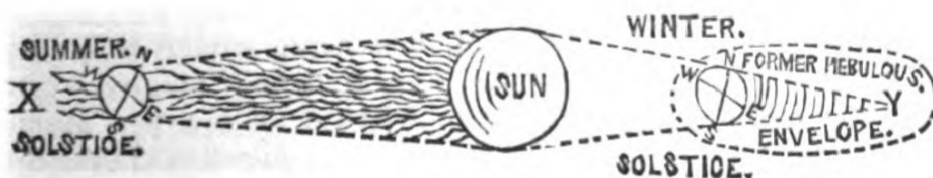
“If electricity moving in currents develops magnetic forces, and if in accordance with an early hypothesis of Sir William Herschel, the sun itself is in the condition of “a perpetual “northern light.” (I should rather say of an electro-magnetic storm), we should seem warranted in concluding that solar light, transmitted in the regions of space by vibrations of ether, may be accompanied by electro-magnetic currents.”





In preceding figure W E is the terrestrial equator, C C is the tropic of Cancer, C' C' the tropic of Capricorn, N S are meridians from 2 to 2 hours; for the sake of simplicity and facility of demonstration we consider these meridians also as magnetic ones; the dotted lines M M' are to represent the magnetic curves of force between the two hemispheres, according to the theory deduced in the preceding chapter; the circles are intended to denote waves of luminiferous ether striking the equator at noon during the equinoxes immediately below the sun; the effect would be the following: under the sun the supposed lines of magnetic force being struck under a right angle can deviate neither to the eastward nor westward and no diurnal variation will shew; but to the right they would be slightly deflected by the circular (or rather spherical) solar waves and the magnet at 4 (having the tendency to remain parallel to the lines of magnetic force), would show westerly diurnal variation; at 6, easterly, and at 5, none; to the left the magnetic curves of force would be deflected the opposite way and more powerfully so, because the ethereal undulations moving with the sun from E. to W. would act on the lines of force like a vessel's bows ploughing through the seas, throwing up other waves in advance; and a magnet at 1 would shew easterly, another one at 3 westerly, and one at 2 no diurnal variation.

During the summer solstice the same phenomenon would take place at C C, during the winter solstice at C' C', thus accounting for annual variation and why there should be a zone near the equator, which alternately, according to the declination of the sun, exhibits the phenomena of the northern or the southern hemisphere.



In the above figure to the left is the earth at the summer solstice, and the undulatory lines connecting the earth with the sun are to indicate ethereal waves, encircling the earth by inflection round it, converging near the hour angle of 12 h., like a divided stream under the stern of a vessel at anchor, producing the second tidal wave of diurnal magnetic variation.

In former ages when the earth was a nebulous mass, comparable almost to ethereal matter itself, these undulations (or radiations?) may have carried nebulous substance along with them towards a point X, and during the winter solstice towards a point Y, forming a conical tail (like a vortex) in the direction of the radius vector, as is still the case with most comets. Now if these ethereal undulations can be allowed as producing diurnal and annual variation, it is easy to see how greater or lesser density of the ethereal medium will influence magnetic variation in the same periods with the greater or lesser frequency of solar spots.

It will be noticed that this is the 3rd suggestion advanced to account for diurnal variation; the first was displacement of the earth's internal magnetic nucleus; the second was tidal motion of the earth's fluid interior; I would be most in favour of this last explanation, provided the regular turning hours of daily variation are not subject to secular change.

The various calculations introduced in several places of this essay are only to answer the same purpose as the diagrams, which are grossly exaggerated to make them more graphic; they are intended to illustrate the principle and nothing more; the data for correct calculations not yet being given, which is much to be regretted.

Humboldt says in the *Cosmos* that the African node (point of intersection between geographical and magnetic meridians), has been advancing to the westward, rather less than half a degree annually, and he thinks that the magnetic North Pole might be moving from west to east, the South Pole from east to west; in the Admiralty Manual it is stated that the system of magnetic lines in the northern hemisphere appears to be moving to the westward, in the southern hemisphere towards the eastward. My opinion still is, after reconsidering carefully the limited material which gradually has come under my notice while writing these several chapters, that both magnetic poles are moving from east to west, about half a degree per annum, more or less; possibly the southern one somewhat slower than the northern one, for reasons stated in a previous chapter of this appendix.

The magnetic North Pole of the variation charts for 1860 is still placed in the same position, where Captain Ross found it 1830, though I believe in 1860, it must have been from  $12^{\circ}$  to  $15^{\circ}$  more to the westward, and perhaps it would be more practical and useful to verify its position from time to time, than to be struggling in vain after the geographical pole.

If I dare to bring this Essay before the public in spite of its imperfections and many shortcomings, it is because I cherish the hope, that some more competent authority, commanding more information, leisure, and means, than myself, might undertake and succeed to sift the erroneous from the truth, to make the latter more readily acceptable.

*Note.*—Dr. Herman J. Klein states in his “*Kosmologische Briefe ueber die vergangenheit, gegenwart und zukunft des weltbaues,*” Graz, 1877, p. 252-253, that Zoellner tried to show the casual connection between the variations of terrestrial magnetism and the state of the sun’s surface, while Hornstein at the same time demonstrated, that declination, inclination and horizontal intensity are subject to periodical changes of 26.33 days’ duration, and that they can only be considered as caused by the rotation of the sun; from this period the sun’s true rotation would be found to amount to about 24.55 days, as deduced by Spörer from direct observations of the sun’s equatorial zone.

If this influence of the sun’s rotation can be accepted as existing, than it would prove that the magnetic axis of the sun does not coincide with his axis of rotation, (analogue to our planet), and during one half solar revolution one solar magnetic pole would present itself to the terrestrial magnetic apparatus, repelling the latter’s pole of the same name and attracting the opposite one; during the other half solar revolution attraction and repulsion of the terrestrial poles would of course be reversed, the whole phenomenon becoming rather complicated by the earth’s daily revolution, its changing distance from the sun and the latter’s changing declination. Admitting that the earth be influenced by magnetism from the sun, than we must also admit, that the earth by its revolution across the field of solar magnetism may generate electric currents (atmospheric electricity, etc.) analogue to revolving metal and other bodies across the field of terrestrial magnetism (compare Deschanel’s *Natural Philosophy*, by Professor J. D. Everett, London 1873, pages 759-760); but then the interesting question presents itself: why should the sun’s magnetic axis not coincide with the axis of rotation? perhaps the answer might be that the sun’s magnetic axis has the tendency to set at a right angle to the plane through the centre of gravity of the whole solar system, the latter differing, according to Laplace nearly  $1^{\circ} 34' 15''$  from the plane of the ecliptic, and the plane of the ecliptic forming an angle of about  $7^{\circ}$  with the plane of the sun’s equator. Another interesting question would be: “are the magnetic poles of

“the sun of the same nature, as the corresponding ones of the earth and other planets, or are they opposite?”

*Note.*—Since the manuscript has been returned to me, to see the proofs of the woodcuts, I have had the good fortune of reading Sir W. R. Grove's *Correlation of Physical Forces* (London 1874), in which on page 122 the following passage occurs, which I consider highly corroborative of my views of universal ether: “Ether, which term we may apply to the highly attenuated matter existing in the interplanetary spaces, being an expansion of some or all of these atmospheres”—(of the sun and planets, etc.)—“or of the more volatile portion of them, would thus furnish matter for the transmission of the modes of motion which we call, heat, light,” etc.

The same eminent philosopher says in the just mentioned work, page 197: “If magnetism be, as it is proved to be, connected with the other forces or affections of matter, if electrical currents always produce, as they are proved to do, lines of magnetic force at right angles to their lines of action, magnetism must be cosmical, for where there is heat and light there is electricity and consequently magnetism. Magnetism then must be cosmical and not merely terrestrial. Could we trace magnetism in other planets and sun's, etc., it would be a great step. . . . Mr. Airy suggests that currents of magnetic force having reference to the solar hour are detected, and seem to produce vortices or circular disturbances and he invites further co-operative observation on the subject, one of the highest interest, but at present remaining in great obscurity.”

“Messrs. De la Rue, Stewart and Loewy were publishing a paper, in which a new theory of sunspots is discussed.—In this paper all differences of luminosity on the surface of the sun are referred to the same cause, namely, the presence to a greater or less extent of a comparatively cold absorbing atmosphere. (Guillemin's “*The Heavens*,” p. 44.)

*The Sun's Atmosphere.*—“It is not at all unlikely, that it may even turn out to have no upper limit, but to extend from the sun indefinitely into space.”—(Ibid, p. 49.)

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## RETROSPECT AND CONCLUSION.

It may not be out of place at the close of these chapters briefly to review the main features of the theory as follows:—



Revolution of the magnetic poles round the geographical one in about (roughly speaking)  $\frac{1}{3}$  of a millennium, probably in an epicycloidal track from east to west.

The revolution of poles is brought about similarly, as the westward tendency of the exterior ocean by the mutual attraction between the celestial bodies and the earth's interior fiery fluid conjointly with the quotidian revolution;—the liquid portion of our planet revolving slightly slower than the solid, amounting perhaps to about  $\frac{1}{2}$  degree per annum.

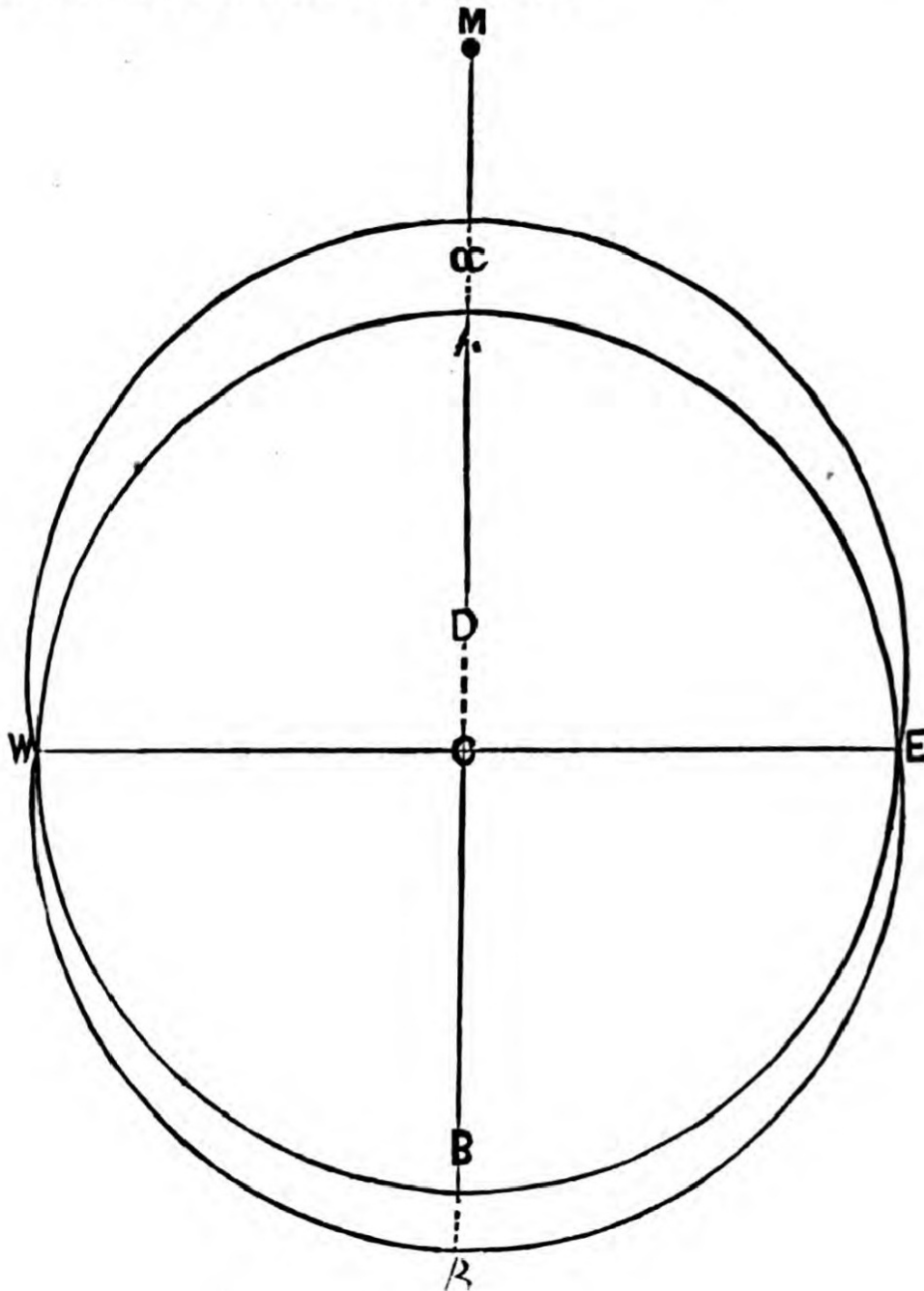
The internal fiery fluid contains a nucleus of great density (owing to the stupendous effect of superincumbent pressure by gravity),\* therefore of great magnetic capacity and coercive force, as must be inferred from Faraday's and Harris's experiments; Dr. Joule says "that steel would be compressed to  $\frac{1}{4}$  of its volume at the centre of the earth." To this extremely dense, perhaps even solidified nucleus, we must look as the seat of terrestrial magnetism, round whose poles all magnetic matter collects like a liquid armature; its axis does not coincide with the axis of rotation, because again owing to the mutual attraction of the heavenly bodies and that part of the terrestrial spheroids internal molten mass, contained in the protuberance at the equator, causing a circuit of current in the fluid interior, which tends to elevate the axis of the nucleus at a right angle with the ecliptic; this tendency conjointly with the daily revolution results in an eccentric circulation of current containing the magnetic nucleus; the strength of current being influenced by aphelion and perihelion, apogee and perigee, opposition, conjunction, quadrature and declination of the celestial bodies; an unequal power of attraction being brought to bear at different times on different portions of the current, is likely to cause irregularities in its shape and motion, to which of course the liquid armature must accommodate itself, causing thereby an unsymetric distribution of the magnetic foci of unequal force; and possibly even a retardation of motion of the magnetic south pole, which irregularities are reflected by corresponding ones on the surface of the planet in the system of magnetic lines, although the latter no doubt are partly also due to the configuration of land and sea, and to the projection upon an ellipsoidal surface from an eccentric internal position.

Annual and diurnal variation are supposed to be caused by

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\* "It has been computed at what depth liquid, or even gaseous substances would from the pressure of their own superimposed strata, attain a density exceeding that of Platinum or even Iridium." (Humboldt's *Cosmos*, vol. I., p. 163.)

the magnetic nucleus describing a circle round its mean daily position during a revolution of the planet in the opposite direction (which former movement the magnetic poles of course must follow) in the following manner :—



Let A E B W be the earth and M the power of attraction of the celestial bodies at new moon, which will attract A most, C less, and B least ; the formation of the flood wave, W Q E is

the consequence, which de facto makes the terrestrial hemisphere W A E lighter, than the opposite one W B E; to restore the centre of gravity of the whole globe W A E B, some contents of the planetary shell must move and the centre of the nucleus is transferred from C to D; now if B has been attracted towards C by a centripetal force proportional to  $(B C)^2$ , then after the transfer of the nucleus from C to D, the point B must be attracted inversely less, as the square of the distance  $(B D)^2$  has increased; the consequence of this will be the movement of B to  $\beta$ , and the formation of the second flood wave W  $\beta$  E; or supposing the excess of attraction exercised by M upon the hemisphere W A E equal to a power capable of lifting one million of tons, than  $\frac{1}{4}$  million tons of matter must shift from the hemisphere W B E into the former, (or the nucleus from C to D), to restore the disturbed equilibrium of the whole. The earth revolving from west to east and D, having the tendency to remain in the direction of strongest attraction M, must describe a circle in the opposite direction; at other times than new moon, the nucleus would be moved by the parallelogram of forces of solar and lunar attraction.

From this it would appear that the centre of gravity of our planet were not geocentric, an occurrence which will seem less strange (besides the reasons already mentioned), if we consider the fact that even the position of the central body of the whole planetary system is not always in the mathematical centre of the latter, "but it actually rotates round the common centre of gravity of the system, which occasionally falls within itself, that is to say, remains within the material circumference of the sun," (Ottes, Eng. transl. Cosmos, Vol. I, page 134) and "in September 1827, Schwabe discovered the eccentric position of Saturn, afterwards confirmed by Harding, Struve, Herschel and South," (ibid, Vol. IV, 521). Anyone acquainted with electric phenomena will conceive, that by such motion and commotion within the earth, electric currents should be generated, which joined to the probable magnetic capacity of the nucleus, will easily account for the existence of terrestrial magnetism; electric knowledge "has also thrown much light on the internal action of terrestrial forces, since magnetism has been recognised as one of the simplest forms under which electricity is manifested" (ibid, Vol. II, 727).

The description of magnetic currents given in the 5. Chap. of the Appendix as a peculiar solenoid-like closed circuit, well explaining all magnetic phenomena, I think not undeserving of

consideration, and it would be interesting to learn, if my view of tidal motion could be confirmed (4. Chap. Appendix.)

In the Journal of the North-China Branch of the Royal Asiatic Society, new series, No. X, Shanghai 1876 (Appendix II) some highly interesting remarks are contained by the Rev. Father M. Dechevreus, S. J.: "J'ai tout dernièrement recon-  
" nue que ces briques " (some building material used at the Zi-  
" ka-wei observatory, nearly four miles from Shanghai), " pro-  
" venant du Tché-kiang, sont notablement magnétiques (celles  
" qui viennent de Tien-tsin ou du Tché-ly le sont au même de-  
" gré) et que la correction à apporter à ces dernières observa-  
" tions est assez forte." . . . . .  
" Pendant la nuit le mouvement de l'aiguille, chaque fois que  
" j'ai fait des observations de 24 heures, a été excessivement  
" faible et difficile à saisir avec le déclinomètre;" (this would  
appear favourable to the view attributing diurnal variation to  
thermo-electricity by the sun, but Humboldt and Sabine assert,  
that it makes no difference in the daily turning hours, whether  
the sun rises very early in summer, or very late in winter; there-  
fore I believe my suggestion of ethereal waves in the last  
chapter of the appendix a more likely explanation), In another  
place the able Zi-ka-wei observer states: " la déclinaison mag-  
" nétique à Zi-ka wei en 1874-75 aurait en moyenne, dans l'in-  
" tervalle de 24 heures présente 3 minima orientaux et 3 max-  
" ima occidentaux." . . . . .  
" Telle est la marche générale du phénomène; en hiver le ma-  
" ximum du matin se présente après 6 h.; de même le mini-  
" mum du soir se rencontre avant 5 h.; de telle sorte que dans  
" l'intervalle de 12 heures, on peut observer dans la courbe  
" semi-diurne deux minima et deux maxima; bien plus j'ai été  
" assez étonné plusieurs fois," (on full and change of the  
moon?), " entr'autres jours le 6 Février 1875 " (new moon about  
4 p.m.), " de constater l'existence, dans le même intervalle de  
" temps, de trois mouvements complets de va-et-vient très-bien  
" marqués et presque d'égale amplitude;" are these daily fluc-  
tuations indicative of the 3 distinct influences by circular mo-  
tion of the nucleus, by the daily ethereal flood wave (Chap. 5.,  
Appendix), and by the internal tides of the molten mass (Chap.  
4., Appendix), the latter dependent on a "subterranean es-  
" tablishment of the port" ?

Humboldt, to whom the science of terrestrial magnetism  
owes so much, repeatedly suggests various plans for investigat-  
ing thoroughly these interesting and important phenomena, a  
correct knowledge of which is of consequence in surveying, en-



gineering, mining, travelling, strategy, etc.; but to no one more than the navigator, the shipowner and insurance companies especially since the large introduction of iron and steel into ship building.

The fragmentary character of these pages is due to their being written at different periods of the present S. W. monsoon (1878), as the necessary information, however, scanty, gradually became procurable, and without the valuable assistance of the gentleman already named, and the kindness of the president, secretary and council of the N.-C. B. of the R. A. S. I would not have been enabled now to submit to the test of public discussion and criticism this essay on *Periodical Change of Terrestrial Magnetism*.

## SECOND APPENDIX TO PERIODICAL CHANGE OF TERRESTRIAL MAGNETISM.

### VARIOUS SUPPLEMENTARY REMARKS.

REGRETTING not to have been able to introduce the following remarks in appropriate places of the various preceding chapters, I must apologize for intruding them now; but I could only lately write them, after the works quoted had come into my possession from the estate of a distinguished and much lamented late member of the N.-C. B. of the R. A. S.

In the journal of the latter Society, No. 2, May 1859, page 222, Captain (Vice-Admiral Sir Charles) Shadwell, C.B., H. M. S. *Highflyer*, states from personal and Sir Everard Home's observations that in Singapore, Hongkong, Shanghai and adjacent places the dip (inclination) of the magnetic needle is increasing and says page 224 "all these changes can be accounted for on the supposition of a gradual increase in the amount of the vertical component of the magnetic intensity of those places."

I beg leave to point out how the increasing magnetic dip in question is explainable by the theory which I have had the honour of bringing before the same Society. Captain Ross found the magnetic North Pole, A. D. 1830 at about  $97^{\circ}$  west of Greenwich =  $141\frac{1}{2}^{\circ}$  east of Shanghai; allowing about  $\frac{1}{4}^{\circ}$  westerly motion per annum would have placed the same pole for the year 1753 in  $58\frac{1}{4}^{\circ}$  west of Greenwich, i.e. on the meridian of

Shanghai *below* the geographical North Pole, when the dip at Shanghai probably may have been near 40 degrees, because that is the amount roughly, according to the inclination chart of the Admiralty Manual at  $180^\circ$  from the magnetic North Pole in Shanghai latitude,  $31^\circ$  north; and about the year 2113 when the magnetic pole should pass the meridian of Shanghai *above* the geographical pole, the dip will probably be about  $60^\circ$ , because that is at present approximately its amount due south of the magnetic pole for Shanghai latitude.

These suppositions accepted, it would be clear that since say 1753 until about 2113 the dip at Shanghai must be increasing, because the magnetic pole in its secular revolution is approaching the latter place, and the nearer the pole, the greater the inclination of the needle. The same reasoning holds good concerning Singapore, although it has southern inclination; the magnetic pole to the southward of Australia in its westerly motion is approaching the meridian of Singapore, therefore the dip must increase. Sir Charles Shadwell also calls attention to the anomaly, that at Woosung, 10 miles to the northward of Shanghai, the dip on the 26th November 1858 was  $45^\circ 2'$  north, 16-17 minutes less than at the latter place on the 10th of June ( $45^\circ 18' \text{ N.}$ ) and on the 16th December ( $45^\circ 19' \text{ N.}$ ) Consulting the same Society's Journal, new series, No. X, 2nd Appendix, Shanghai 1877, it will be found that on the 3rd October 1875 the dip at the Zi-ka-wei observatory was  $46^\circ 26' 15''$  north, and next month 21st November  $46^\circ 9' 38''$  north; the actual greatest difference may probably have escaped observation, because unfortunately for 1875, from April to December, only 34 observations are recorded; the amplitude of horizontal variation, more extensively observed, has certainly been greater; for the Rev. Père M. Dechevreux, S.J., states in the same place the greatest difference to have been 21.51 minutes. From this great difference at one and the same place in less than two months' interval it appears doubtful, whether the anomaly pointed out by Sir Charles really does exist, or whether it has been only accidental; the same remark applies to the observations at Kintang and Ningpo of the same paper.

There is always a fleet of native and foreign men of war in the port of Shanghai; there is a harbour master's station and a telegraph office now at Woosung; might it not be possible to make arrangements for taking a series of dip observations near Woosung, simultaneously with the Rev. Jesuit Fathers at the Zi-ka-wei Observatory, to discover the true state of the magnetic elements in the vicinity of this influential emporium of cos-

mopolitan enterprise? It is of interest and importance to study the variation of the magnetic elements in these parts of the world, in order to understand the nature of that peculiar oval of western variation, in which Shanghai is situated, and which, judging from Bohn's edition of Humboldt's *Cosmos*, Vol. I, pages 174-175, at Columbus's time must have been in the North Atlantic between the Azores and the shores of the new continent: "We can with much certainty fix upon three places "in the Atlantic line of no declination for the 13th September "1492, 21st of May 1496 and the 16th of August 1498. The "Atlantic line of no variation at that time ran from N. E. to "S. W."—(corresponding to that portion of the *oval* now between the Philippine Islands and the Pacific Ocean to the eastward of Japan,)—it then touched the South American continent "a little east of Cape Codera," etc.,—which latter line may have been the one now passing through Australia. Too much reliance, however, cannot be placed on those early observations, either european or oriental, for on page 175 of the same volume we read that in Paris 1669 the variation was null, while other authorities give the year 1663; on page 174 we find on the 13th September 1492 the "line of no variation was "3° west of the meridian of the island of Flores"—and in the Vth Volume of the same work, page 54, we see that the same line on the same date was 2½° east of Corvo, Azores Islands. It is therefore all the more an important duty for the present generation to investigate the magnetic changes more minutely. From Columbus' time to its present position this interesting oasis of western declination would have performed about half a revolution round our planet from east to west in somewhat more than three centuries. Humboldt suggests repeatedly various plans for discovering the true state and nature of terrestrial magnetism; the best proceeding perhaps would be, to establish an international commission by special delegates from all civilized nations, to ascertain four or five times every century by numerous land and sea expeditions after well concerted plans the exact state of the magnetic elements all over the globe, in connection with the fixed magnetic observatories already existing; the expenses to be borne proportionally by all governments concerned. In Vol. II, No. 1 of this Society's Journal, Shanghai 1860, page 95, a supplementary memorandum by Admiral Shadwell is contained with some additional useful information concerning the magnetic elements in these regions, and I am confident, that by some more reliable observations taken in the present century the westward move-



ment of the ellipse of western declination in eastern Asia can be proved.

In No. XI of the same Society's Journal, Shanghai 1877, in a paper by Dr. J. Edkins "On the Variation of the Compass as observed in China in the VIIIth, IXth, XIth, XIIth and XVIIth Centuries," much valuable information is contained. Dr. Edkins says, page 140, that Mr. Wylie cited a passage from Su-kwang-ki, which states: "there is a variation for every place. In Peking the variation is  $5^{\circ} 40'$  east; this is found in his work Li-yi;" page 139: "hence we learn that the variation was eastern in China in A. D. 713 and at about A. D. 900. After that it became western and was so about A. D. 1080 and nearly a century later, at the time of Lai-wen-tsiün." Dr. Edkins thinks, that since the Tang dynasty the needle may have had western declination, and exchanged it again for eastern, two or three times. "Shen-kwa is quoted as saying that in the place where he was writing the needle persistently pointed to *ping-wei*. Transferred to our compass this is the same as  $15^{\circ}$  to the west of north." From a remark on page 142 it seems that in 1080 and 1160 the variation in China was westerly,  $7\frac{1}{2}^{\circ}$  in the latter year.

Dr. Edkins arrives by means of Ganot's Physics, translated by Atkinson, at the same conclusion, to which I have been led by Müller-Pouillet's work. It may not be uninteresting to reproduce here, from the transactions of the China Branch of the Royal Asiatic Society, part 1st, Hongkong, 1848-50, p. 163, the following curious precept for magnetisation from the Chinese cyclopædia Tung-teen-shaou, as extracted by Dr. W. A. Harland:—

"To make Needles point to the South.—Take of vermillion, orpiment and iron filings of each several fun (one fun equal to 6.4 grains avoirdupois), reduce them to an impalpable powder, and mix together with blood from the comb of a white cock. Twenty or thirty needles are to be mixed up with this composition, well folded in paper and placed in a furnace where they are to be exposed to the highest heat of a charcoal fire for seven days and seven nights. They are then to be taken out and folded up in a piece of flesh for three days, after which they may be removed and placed on the surface of water to ascertain whether they turn towards the south and are fit for use." Iron possessing the greatest magnetic capacity, when red hot, it is not impossible that the needles may acquire magnetism by induction from the earth, especially if placed parallel to the magnetic dip, which induced magne-



tism may become permanent, if the needles by the described procedure, (brisk insertion, whilst hot, into flesh), have become hardened, converted into steel. The Chinese do not seem to have discovered the magnetic inclination. It appears, that the manifestation of magnetism is more dependent on the extent of surface, than on the mass of magnetic bodies; an empty iron tank, for instance, according to Commander W. Walker, R.N., exercises the same influence on a compass, as a solid mass of iron of the same size; therefore it may perhaps be possible to give a greater directive force to the mariners' compass card by using hollow magnets in its construction, thereby increasing the magnetic surface of the apparatus, without increasing its weight.

The importance of the superficial area of magnets is further illustrated by the fact that several magnets closely joined together to form a magnetic battery, possess less magnetic intensity, than the sum of intensities of the individual magnets would amount to; simply because the battery exposes and affords less surface to the display of magnetic currents, than the surfaces of the single magnets amount to, when separated. Perhaps some desirable information concerning local magnetic changes can be derived from Japanese or Dutch authors, on account of the latter's early connection with Japan and Formosa; instructive records of these phenomena in China and Japan may also be contained in the Portuguese and Spanish archives in Macao and Manila. The following series of magnetic observations in the vicinity of the head quarters of this Branch of the R. A. S., Shanghai, are by high authorities, and extracted from the Society's Journal:

June 1843, dip by Sir E. Home,  $44^{\circ} 75'$  N.

June 1858, dip by Sir C. Shadwell,  $45^{\circ} 18'$  N.; declination,  $2^{\circ} 29'$  W.—Race Course.

June 1858, dip by Sir C. Shadwell,  $45^{\circ} 19'$  N.; declination,  $2^{\circ} 32'$ —Consular Flagstaff.

A. D. 1875, dip by Father M. Dechevrens,  $46^{\circ} 15.8'$  N.; declination,  $1^{\circ} 59.82'$ —Zi-ka-wei.

A. D. 1874-1875; intensity, horizontal, 6.94867; vertical, 7.25868. Total, 10.04850.

In Deschanel's *Natural Philosophy* by Professor Everett, London 1873, page 633, the following passage occurs: "As to dip, its amount at Paris has continued to diminish ever since it was first observed in 1671. From  $75^{\circ}$  it has fallen to  $66^{\circ}$ , its present value. As its variations since 1863 have been scarcely sensible, it would seem to have now attained a mi-

"nimum to be followed by a gradual increase." By an inspection of the figures on page 631 of the same work, it will be remarked that the isoclinal lines form more or less regular ellipses round the magnetic poles, which in several parts of their configurations almost coincide with the parallels of latitude for some distance; such a coincidence of secular motion has probably happened in 1863 at Paris, when the dip will appear stationary for some time. A similar thing may happen in regard to the *western declination in China*; the greater axis of the oval running north and south, the northern and southern parts of the oval isogonic lines will nearly coincide with the parallels of latitude, and when the maximum of western variation is reached at any place it will remain stationary for some time, and then it will decrease. This hypothesis applied to the above table from the Society's Journal, it would appear, that since Sir Charles Shadwell's observations of the declination the north and south axis of the oval must have been passing towards the westward.

According to the international code of signals, London 1877, page 233, the magnetic declination has decreased about a quarter of a point during the last fifteen years in England. By a careful perusal of the Admiralty Manual of Scientific Enquiry, London 1871, my opinion concerning tidal motion appears confirmed by the following sentences: "With regards "to the stream of flow and ebb, they are often not merely two "streams in opposite directions at different times of the tide; "they generally turn successively into several directions, so as "to go quite round the compass in one complete tide, either in "the direction N. E. S. W. with the sun"—(in places to the northward of the sun?)—"or N. W. S. E. against the sun," pages 71-72—(in positions to the southward of the sun?)—"In "all land areas in the northern hemisphere the wave of high "water tends to revolve round the coast in the direction of the "hands of a watch and in like areas in the southern hemisphere against the hands of a watch; leaving out of the question the theoretical (Mr. Carrick's) considerations, on which "are based these results, the degree of truth contained in the law, "regarded merely as empirical, *is worthy of very severe scrutiny.*"

Much less appears actually to be known yet of tidal movements than is generally supposed; "the general progress of the "tide wave along even the most frequented shores is still imperfectly known; and about the connection of the tides over "the general areas of large oceans we are as yet entirely in the "dark; there is therefore an ample field of important and use-

"ful discovery in this subject," (page 78) and "in the central parts of the Pacific the tides are small and anomalous, for they do not clearly depend on the moon," etc., etc. It is possible, that the last mentioned phenomenon may be due to the very probable fact, that the earth's solid crust covered by the Pacific may be thinner, than at other portions of our planet and therefore the outer crust, ocean and interior fiery fluid matter together yielding more equally "to the deforming influences of centrifugal force and the attraction of sun and moon," (Mr. Kingmill's *Borderland of Geology and History*, page 5), which would certainly have the influence of letting the oceanic tides appear "small and anomalous."

The same remark applies to Batavia; "by accurate observations made in 1839 at Onrust, it seems that the tides and rise and fall are not subject to fixed rules. The mean rise and fall was two feet, and the maximum and minimum four feet." (Findlay's *Sailing Directory for the Indian Archipelago, China and Japan*, London, 1870, page 613.)

I must acknowledge with thanks that I have been under obligation, when writing this second appendix, to the kind assistance of Mr. John Christie, chief engineer of the China Navigation Company's steamer *Chefoo*.

After the above lines had been sent to press, I have been favoured by the urbanity of the talented and zealous director of the magnetic and meteorological observatory at Zi-ka-wei, the Rev. Father Marc Dechevrens, S.J., with his reports for 1876-77 and a general resumé for 1878, from which the following facts are extracted:—

	1876	1877	1878
Declination .....	2° 1' 24" W.	2° 1' 21" W.	2° 0' 04" W.
Inclination .....	46° 13' 43" N.	46° 13' 38" N.	40° 13.4' N.
Horizontal } Compo-	6.95131	6.9637	6.9770
Vertical } nent ...	7.25602	7.2684	7.2815
Total Intensity .....	10.04924	10.0656	10.0846

The learned and Reverend Father states in regard of the mean values for the inclination and intensity in 1878 that during the months of May and June the observations had to be interrupted: "les travaux d'agrandissement de notre salle

“magnetique m'ont forcé à interrompre les observations directes d'inclinaison et d'intensité.”

In his “Bulletin des Observation de 1876” Father Deehévrens describes an ingenious apparatus in use at Zikawei; “cet appareil à lui seul pourra, avec un chronomètre, constituer tout le bagage scientifique et géographique à travers la province, servant tout à la fois de théodolithe et de boussole pour l'inclinaison, la déclinaison et l'intensité magnétiques.” If all Meteorological Observatories were supplied with this useful instrument, the mysterious periodical changes of terrestrial magnetism in the Far East would be much sooner revealed indubitably, than can be done by the solitary efforts of a single institution, although the observations be carried on in such a careful, intelligent and skilful manner, as at the excellent Zikawei Observatory; only by many valuable observations in numerous localities and extended over *long periods of time*, this interesting and important problem can be solved; a truth, beautifully illustrated by the Hexameter, which King Ludwig of Bavaria, caused to be engraved near a picturesque waterfall in the Alps:

“Gutta cavat lapidem, non vi, sed saepe cadendo.”

I believe I cannot close these pages in a more appropriate manner, than by the remark from the illustrious Humboldt's *Cosmos* (Bohn's edition, Vol. II, page 720), that “several times every century an expedition of ships” (in conjunction with the fixed observatories ashore and land expeditions) “should be sent out to examine as nearly as possible *at the same time* the state of the magnetism of the earth, so far as it can be investigated in those parts covered by its ocean. May permanent scientific institutions (Academies) impose upon themselves the practice of reminding every twenty-five or thirty years' governments, favourable to the *advance of navigation*, of the importance of an undertaking, whose great cosmical consequence depends on its long continued repetition.”



## ERRATA.

Page 38—Middle of page read 1663 instead of 1163.

„ 38—21st line from bottom read “minimum” for “maximum.”

„ 40—Middle of page read (Celsius) instead of (celsius.)

„ 41—14th line from top read “slag” for “slake”

„ 46—Middle of page read “do not coincide” instead of “does not coincide”.

„ 46—12th line from bottom read “diurnal” instead of “diurned”.

„ 47—11th line from top read “observatories” instead of “observations”.

„ 48—10th line from top read “1841, angle” instead of “1841. Angle”.

„ 50—10th line from top read “armature” instead of “armisture”.

„ 52— 7th line from top read “elliptic” instead of “ecliptic”.

„ 52—17th line from bottom read “full or new moon” instead of “full moon”.

„ 56— 6th line from top read “hemisphere” for “hemispheres.”

„ 57—13th line from bottom read “Sabine” instead of “Sabini”.

„ 63— 2nd line from top read “Gales” for “Galese.”

„ 64—16th line from top after “directions” add; *were*.

„ 65— 1st line from top read “current” for “currents.”

„ 65— 4th line from top read “similar” for “singular.”

„ 65—12th line from bottom read “Sn” for “SN.”

„ 67— 7th line from top after “which” add: according to.

„ 68— 6th line from bottom read “Dr. Brünnow” for “Dr. Brünnout.”

„ 68—12th line from bottom read “Stromboli, (volcanoe)” instead of “Stromboli (volcanse.)”

„ 69— 6th line from bottom read “relations” instead of “rotations”.

„ 69— 9th line from bottom read “statical” instead of “statistical”.

„ 69—17th line from bottom read “noyau” instead of “noyan”.

„ 69—middle of page read “Biot, Hansteen and others have had.”

„ 70— 9th line from bottom read “closer” instead of “closed”.

- „ 70—The sentence “On the 1st of September,” etc. should have been printed as a note to the 6th Chapter of the first Appendix.
- „ 72— 5th line from bottom add: “I copy as follows:”
- „ 73—17th line from top read “exist” instead of “exists.”
- „ 85—15th line from bottom read “then” for “than.”
- „ 90— 6th line from top read “Dechevrens” for “Dechevreus.”
- „ 90— 7th line from top read “reconnu” for “reconnue.”
- „ 90—10th line from top read “viennent” instead of “vieunent.”
- „ 90—21st line from bottom read “présenté” for “présente.”
- „ 90—18th line from bottom read “présente” for “présenté.”
- „ 98— 6th line from top read “constituer” and “géographique” instead of “constiteur” and “géographique.”

### ARTICLE III.

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## THE FAMILY LAW OF THE CHINESE, AND ITS COMPARATIVE RELATIONS WITH THAT OF OTHER NATIONS.

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BY P. G. VON MÖLLENDORFF, ESQ.

THE following essay on the Family Law of the Chinese is the first endeavour to treat scientifically a part of Chinese law. The reason which led me to choose the family law was that in making extracts from Chinese works I found this portion of the law first completed. It may, therefore, serve as an introduction for a work to be compiled, viz., the Laws and the Legal Procedure of the Chinese.

The interesting work (in German) of Dr. Samuel Mayer on the laws of the Israelites, Athenians and Romans has furnished me with many comparisons, ideas and quotations, as have also other works on Roman law. I have in addition, found of considerable use the essays anonymously published in the *China Review*, Hongkong, vol. V. (1877) p. 404-7; vol. VI, p. 64-66.

Some sentences have been taken from Maine's *Ancient Law*, 6th edition, 1876, and from John Fergusson McLennan's studies in *Ancient History*, comprising a Reprint of *Primitive Marriage*, an Inquiry into the origin of the form of Capture in Marriage Ceremonies. London, 1876, especially chapter II., p. 13 ss.

I am especially indebted to my friend E. H. Parker, Esquire, of H.B.M.'s Consular Service, for some valuable notes relating to the subject.

Of the extensive Chinese literature on law, I have principally consulted the following works:—

**大清律例** *Ta-ch'ing Lü-li*, the statute law and the ordinances of the present dynasty. 40 vols., 1866. The statute laws and some of the ordinances have been translated by Sir G. T. Staunton; see Manual of Chin. Bibliogr. No. 201.

**說帖類編** *Shuo-t'ieh Lei-pien*, collection of decisions from the years 1821-34 (Taokwang). 32 vols. 1835. 8vo.

**大清律例按語** *Ta-ch'ing Lü-li An-yü*, collection of decisions from the reigns of Yungcheng, Kienlung, Kiaking and Taokwang, 1724-1847. 80 vols., 1847. 8vo.

A manuscript collection in 14 large volumes; containing decisions from the reign of Yungcheng till Hsien-feng (1723-1851), compiled by law secretaries (師爺) of the Governors of Hunan.

Collections like this are extremely rare and valuable.

In the arrangement of the subject before me, I have taken as a basis the Roman law; as owing to its logical structure and general completeness this law has become a typical system, and has formed the foundation of the jurisprudence of all European nations.

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## TABLE OF CONTENTS.

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### Introduction.

#### A.—On Marriage.

- I General Remarks.
- II Requirements for concluding marriages.
- III Betrothal.
- IV Marriage.
- V Relation of husband and wife to each other.
- VI Dissolution of marriage.
- VII Polygamy.



## VIII Second nuptials, and violation of the time of mourning.

## B.—On Patria Potestas.

## I General Remarks.

## II On the rights of both parents with regard to their children.

## III On the rights of the husband with regard to his wife.

## IV On the duties of children towards their parents.

## V Acquisition of patria potestas.

*a* By Marriage.*b* By Procreation.*c* By Adoption.

## 1 General requirements.

## 2 Special requirements of

*aa* Arrogation.*bb* Datio in adoptionem.

## 3 Effects of arrogation and of adoption.

## VI Termination of patria potestas.

*a* Without the will of the father.*b* With the will of the father.

## C.—On Guardianship.

## INTRODUCTION.

THE Chinese expression for "family" (家 *chia*) embraces, like the Attic *οἶκος*, all members of the same household, which stand under one head or *pater familias* (家父 *chia fu*), without distinction, whether they have entered the family through marriage or adoption. It is obligatory that all members of the family bear the same family name (姓 *hsing*).<sup>1</sup> Even with adoption a kind of quasi relationship is formed with the acquisition of the clan-name.

At the oldest time of Chinese history the number of families may have been the same as the number of clans;<sup>2</sup> the idea that there exists a kind of relationship between families bearing the same name, has lived to the present time (see below—Impediments to Marriage).

<sup>1</sup> As in India, Greece and Rome, McLennan, l.c., p. 217.

<sup>2</sup> S. Wells Williams in his Syllabic Dictionary, p. 1242, dates back the beginning of family names to over 3000 years, without, however, quoting any authority.

A family is founded with the consummation of marriage and the expression 成家 *ch'eng chia* means to marry as well as to found a family.

Within the family the Chinese distinguish four grades of relationship, which follow according to the proximity of descent, without distinguishing thereby between consanguinity and affinity. A genealogical table is given in the 大清律例 vol. I., fol. 1-6.

The slaves are also counted as belonging to the family, and their name 家身子 *chia shen-tzū* has almost the same meaning as the Greek *οἰκέτης* (compare also the Latin *familiaris* and the French *maison* with the same sense).

As a relationship is always indicated by having the same family name, it may here be stated that the Manchus, whose emperors have reigned over China since 1644, have not used their family names (姓 *hsing*, Manchu *hala*) since the reign of the emperor Kanghi (1662-1723), but only their personal names (名 *ming*, Manchu *gebu*). The family names are, however, known within the clans, and the law concerning family names is the same for the Manchus as for the Chinese.<sup>3</sup>

## A.—ON MARRIAGE.

### I.—GENERAL.

MARRIAGE is regarded by the Chinese as something necessary and indispensable: and the best proof of this is furnished by the fact that, excluding those of the priests who are not allowed to marry, it is scarcely possible to find a bachelor; and an old maid is an extraordinary rarity. Chinese law further recognises the importance of marriage by giving a long list of marriage laws. We must add, however, that marriage is not absolutely compulsory, nor is celibacy punished, as was the case under Jewish law and the Attic Code of Solon.<sup>4</sup>

The Chinese distinguish between two kinds of marriage which, not uncorrectly, may be termed *connubium* and *concubinatus*. In the first case they are obliged to be content with one wife (妻 *ch'i*),<sup>5</sup> who is chosen by the head of the family from a

<sup>3</sup> See Williams l.c. p. 1243.

<sup>4</sup> See Mayer l.c. vol. II., p. 286: Among the Israelites each man was obliged to marry and could be forced by the authorities to fulfil this duty until he had a son and a daughter, compare Pollux III., 48. VIII., 40.

<sup>5</sup> Like the Roman law, § 7. J. de nuptiis 1, 10.—L. 2, C. 5, 5.

family of the same position and circumstances. Concubinage is, however, at the same time permitted, and marriage with several concubines (妾 *ch'ieh*) is allowed. The number of these, besides the one wife, is not limited by law, but only one wife is permitted.

Whilst the marriage with the wife (妻 *ch'i*) is concluded by the parents of the two parties, the man is allowed to choose himself the concubines, who may be of low rank, even slaves. The concubines, without regard to priority of marriage, have amongst themselves equal rank, but are subjected to the wife.

The husband has not the right of degrading, without sufficient reason,<sup>6</sup> his wife to the rank of a concubine; nor of raising a concubine to the rank of a wife while the wife is alive.

The wife is considered the mother of all the children born in the family;<sup>7</sup> and the reason for the greater number of marriages with concubines is barrenness of the wife.<sup>8</sup>

## II.—REQUIREMENTS FOR CONCLUDING MARRIAGES.

### a.—ABSOLUTE IMPEDIMENTS TO MARRIAGES.

THE attainment of puberty required by the Roman<sup>9</sup> and the Canon<sup>10</sup> law, or of a certain age, as prescribed by modern legislation, as a pre-requisite for concluding marriage is not known to Chinese law. It is, however, an established custom, that men marry when over twenty years of age, and that girls are rarely given in marriage before their fifteenth year. But as there are many exceptions in the laws for the benefit of persons under fifteen years of age, we may consider the latter as the age required for concluding a marriage. Non-attainment of puberty, disease, or other defects (as insanity, deafness and dumbness, etc.) are considered impediments, if when entering into the marriage contract, no notice had been given of them.

The right of having eunuchs is granted, besides to the emperor, only to the highest members of the imperial family; and

<sup>6</sup> See Impediments of marriage.

<sup>7</sup> The same in Jewish law, see Mayer l.c. II. p. 339 and in Mohammedan law, see G. Rosen in Zeitschr. d. Deutschen Morgenl. Ges. XXII. (1868) p. 543.

<sup>8</sup> Compare the Jewish custom, Mayer l.c. p. 339: as it was considered a disgrace, if a wife had no children, the wife in such case induced her husband to take a maid-servant as concubine, the children born by such concubines were hers, so that she was not childless.

<sup>9</sup> Pr. J. de nuptiis 1, 10,—l. 14 D. 23, 1, 1.—4 D. 23, 2.

<sup>10</sup> Tit. X., 4, 2. Lib. sext. Decretal, 4, 2.

as eunuchs only serve in the palace, it is, for this reason, impossible for them to conclude a marriage.

There exist, however, eunuchs at Peking, who have had children before their castration, and who are allowed to visit their families from time to time. Cases may occur in which an eunuch who, by intrigues in the palace, has arrived at a position of honour may take a wife *pro forma*.<sup>11</sup>

It is forbidden to take a second wife (妻 *ch'i*), as long as the first one is living.

b.—RELATIVE IMPEDIMENTS.

1.—ON ACCOUNT OF RELATIONSHIP.

MARRIAGE between relatives of all grades of relationship, is prohibited, no matter whether the relationship be one of consanguinity or of adoption. For the latter, however, in contradistinction to the requirements of the Roman law, the prohibition does not hold good after the first adoption has been dissolved by a new adoption.

It may here be observed that there exists no relationship between the husband and his wife's sister, as is the case according to the canonical and, after it, the English law. Altogether there exists no relationship between the relations of the husband and those of the wife.<sup>12</sup>

In the Institutes of Menu it is laid down that a twice-born man (*i.e.* one belonging to the sacerdotal, military, or commercial class, Menu X., 4) might elect for nuptials "a woman not descended from his paternal or maternal ancestors within the sixth degree and who is not known by her family name to be of the same primitive stock with his father." Menu III. sec. 5, in McLennan p. 84. They (the American Indians) profess to consider it highly criminal for a man to marry a woman whose totem (family name) is the same as his own, and they relate instances when young men, for a violation of this rule, have been put to death by their own relatives, *ead.* p. 97.

Relationship is always implied by the fact of having the same family name, 同姓不爲婚姻 *Tung hsing pu wei hun yin* people of the same family name do not intermarry. Considering that for a population of 400 millions only about 350 family names exist, this impediment appears severe in the highest

<sup>11</sup> See G. C. Stent, Chinese eunuchs, Journal of N.-C. B. of the R. A. S., Shanghai, 1877, New Series, No. XI., p. 143 ss.

<sup>12</sup> As in the Jewish law, see Mayer l.c. II. p. 284.



degree. In the course of ages<sup>13</sup> it happened, that whole communities in China were composed of people who had the same family name; so that men desirous of marrying had to look elsewhere for wives, and had to undertake for this purpose voyages often expensive. An expedient to mitigate this law had, therefore, to be found. During the reign of Yung-lo (1403-25) those families, who took part in the grain transport to Peking, received the name of military families (軍家 *Chün-chia*), the others being called 民家 *Min-chia* families of the people. Since that time the distinction between 軍 *Chün* and 民 *Min* has been maintained and marriages between a 軍 *Chün* and a 民 *Min* family bearing the same family name is permitted as the only exception from the above mentioned prohibition.

## 2.—ON ACCOUNT OF AFFINITY.

MARRIAGE is not allowed with one's step-daughter, with the father's or the mother's sister-in-law, with the cousin, with the sisters of the son-in-law, or of the daughter-in-law, with the sisters of the grandson's wife, or with nieces.

Further, marriage is forbidden with female relatives outside the fourth degree of relationship,<sup>14</sup> with widows of a relative of the fourth degree or with the sister of the widowed daughter-in-law. Marriages with widows of relatives of a nearer degree are considered incestuous.

Decapitation is the punishment for marriage with the father's or grandfather's former wives, or with sisters of the father. Whoever marries his brother's widow is strangled.<sup>15</sup>

## 3.—ON ACCOUNT OF OTHER REASONS.

To CONCLUDE marriage is prohibited during the legal time of mourning. This is

1—	For near relatives of the 1st degree :	3 years.
2—	„ other „ „ 1st „	3-5 months.
3—	„ relatives „ 2nd „	9 „
4—	„ „ „ 3rd „	5 „
5—	„ „ „ 4th „	8 „

Marriage with concubines, is, however, in this case not punished, unless either the bride or the bridegroom is in mourn-

13 The prohibition occurs in books as early as the 左傳 *Tso-chuen* and 論語 *Len-yü*.

14 As in canonical law, cap. 8. X., 4., 14, Walter, Kirchenrecht § 310.

15 In contradistinction to the Jewish law.

ing for a parent, or the bride for her late husband.<sup>16</sup> It is considered a time of mourning for children or grand-children if father or mother, or grand-parent is confined in prison for a capital crime. In accordance with the principle of Chinese marriage, that the *pater familias* makes the marriage contract, marriage is in this case permitted, if the head of the family in prison gives his assent. The usual ceremonies and festivities are in such cases to be omitted.

Marriage is forbidden with a woman who has committed a crime and has fled for fear of punishment. In this prohibition is included marriage between an adulteress and her seducer.<sup>17</sup>

Whoever forces the wife or daughter of a free man to marriage, either with himself or with a son, grandson, younger brother or nephew, i.e. with a *filius familias*, is to be strangled.

According to Roman law marriage could not be concluded between persons, who stood to each other in the relation of guardianship, as *tutor* and *pupilla*.<sup>18</sup> In China *tutor* and *pupilla* are near relatives, as only relatives or adoptive parents are able to exercise the right of guardianship and to acquire through it the *patria potestas*. A runaway female slave is not allowed to marry, as she can be lawfully given into marriage by no one except her master.

A widow cannot remarry without consent, as she always remains under *patria potestas* and as somebody is required to whom the purchase money may be paid.

A widow, who has received an imperial reward for her faithfulness to her late husband, is not allowed to marry again.

Officials cannot hold office in their native province, perhaps for the reason that by this measure greater impartiality is secured. For the same reason it is not allowed to them to marry a woman under their jurisdiction, or out of a family that has an interest in the performance of their official duty.<sup>19</sup>

16 The same in Roman law l. 1, 11 § ult.—l. 12, l. 13, pr. D. 3, 2—const. 2 C. 5, 9. Widows and their new husbands were punished, if remarried before the end of the time of mourning.

17 Also prohibited by Roman law, l. 26. D. de ritu nupt. (23, 2).—l. 13, D. de his quae (34, 9). Nov. 134 si quis autem c. 12,—by Attic law L. 11 § 11. L. 40 D. ad leg. Jul. de adult. (48, 5), and by Jewish law, see Mayer l.c. II p. 320.

18 L. 59, l. 62 § 2, l. 66 D. de ritu nupt. (23, 2), C. 5, 6.

19 A similar thought prohibited in Rome marriage between a *praeses provinciae* and a woman of his province; l. 57 pr., l. 63 D. de ritu nupt. (23, 2); Cod. Th. 3, 11, Cod. Just. 5, tit. 2, 7.

On account of inequality of rank marriage between officials and actresses and singing girls is prohibited. Such marriages are also forbidden to the sons or grandsons of officials of nobility with hereditary rank (*disparagium, mesalliance*), the punishment in this case is degradation to a lower class of nobility and eventually loss of nobility.<sup>20</sup>

Buddhist priests (和尚 *Ho-shang*) and nuns (尼姑 *Ni-ku*), and those Taoist priests (道人 *Tao-jen*) and nuns (道姑 *Tao-ku*) who do not shave their heads, are not allowed to marry. Only those Taoist priests (道士 *Tao-shih*, also called 門祝 *Men-chu*), who shave their heads and plait their hair like other Chinese, may conclude marriages.

A priest who obtains a woman under the pretence that she shall marry another, and who then marries her himself, is severely punished.

Marriage is impossible between slaves and free women.<sup>21</sup>  
*Note.*—It is not considered decent in China for a widow to marry again.<sup>22</sup> Should the head of the family try to force her into marriage, she is not obliged to obey his *patria potestas*, but may remain with the family of her late husband. Should however the marriage be concluded, she shall live with her new husband, the marriage presents, or rather the purchase money paid for her being forfeited to the Government.

20 There are in China 5 classes of nobility (爵 *chüeh*) : 公 *kung*, duke, 侯 *hou*, prince, 伯 *po*, count, 子 *tsu*, baron, 男 *nan* baronet. When the nobility conferred is not "perpetually hereditary" each descendant takes one rank lower than his father; so that the son of a *kung* becomes *hou*, the son of a *hou* becomes *po*, and so forth, nobility ceasing altogether with the son of a *tsu*. 侯 *hou* (I may be permitted to remark here) has generally been translated by marquis. But this title is of limited use and does not express the rank of a *hou* as well as prince; as in former times the 諸侯 *chu-hou* were feudal princes and not feudal marquises.

21 See Mayer l. c. II p. 301. According to the laws of the Longobards parents had the right to kill or sell their daughters, if they married one in socage. Leg. Long. lib. II tit. 9, § 2; L. Rothari c. 222.

22 Puchta, Instit. des röm. Rechts. III p. 177: it was decent according to the Roman national feeling, that a widow should remain single, *univira* meant the same as *castissima*. She was highly esteemed and received the wreath of chastity. Val. Max. II c. 1 Propert. IV eleg. 12. The Israelites however were much in favour of a second marriage of widows, see Mayer l. c. II p. 322.

## c.—EFFECTS OF THE IMPEDIMENTS TO MARRIAGE.

Any impediment to marriage renders the marriage, as, in the time of Justinian,<sup>23</sup> though already concluded, null and void; the *impedimenta* are always *dirimentia*. Ignorance of them exempts the parties from punishment, but the marriage is dissolved. According to the sense of the marriage contract the parties who signed it are punished, if the marriage laws are transgressed; but the husband and wife, are not punished unless they are *sui juris*. If the father, grandfather or uncle signed the contract, they alone are punished; if it was another relative, he is punished as principal, and the husband and wife as accomplices. The purchase money is in each case forfeited, except when the parties were ignorant of the existence of the impediment.

A dispensation in cases of impediments to marriage is not admissible.<sup>24</sup>

Difference of religion has in China no influence upon marriage.

## III.—BETROTHAL.

## a.—THE CONTRACT.

THE conclusion of a *justum matrimonium* has to be preceded by a contract,<sup>25</sup> in which the amount of presents (*arrhae sponsalitia*) and the latest day for concluding the marriage is fixed. This contract is made, and if in writing, is signed by those persons, in whose *patria potestas* the bride and bridegroom stand; the latter never sign it, unless both have no older relatives; this latter condition, and the fact of the son holding office, being the only cases, in which a *filius* or a *filia familias* becomes *sui juris*. This is the chief distinction between the Chinese and the Roman marriage.

In Chinese marriage there cannot exist the *animus matrimonii*, the intention of husband and wife to form a connection for life, which is the chief requirement in the Roman marriage. According to Roman law the assent of the *pater familias* was required, but could only be refused for special reasons; husband and wife, however, were allowed free choice.

23 § 12 J. de nupt. (1, 10). Cod. 5, 8.

24 The Israelites also did not know of such dispensations, see Mayer l.c. II, p. 315.

25 Known by the Romans, Dig. 23, 1.—Cod. 5, 1; and by the German law, Eichhorn, *Rechtsgeschichte* § 54, § 183, § 321.



Among the Chinese the heads of the families choose alone, and the inclination of the principal parties is not asked.

Before the signature of the marriage contract by the heads of the two families, both parties convince themselves of the truth of the statements regarding the persons of the bride and bridegroom, that they are sound in body and mind, and that they are not too old. The festivities of the betrothal then commence. As lies in the nature of the case, the age of the betrothed parties is of no consequence.<sup>26</sup> It often happens, that a betrothal is made between friendly families at a time, when the bride and bridegroom are not over three or four years of age.

#### b.—EFFECTS OF BETROTHAL

THE contact of betrothal gives both parties a right to sue for the conclusion of marriage.<sup>27</sup> The party who refuses to keep the contract is punished with fifty blows, and the court enforces the marriage. In case in which the contract was not made in writing, the acceptance of presents is taken as an agreement to the contract.

The betrothal may even be maintained, if the family of the bride enters a second betrothal<sup>28</sup>; and only in case that the family of the bridegroom waives its claim, may the bride marry the second bridegroom. The presents are, in the latter case, to be returned.

A forcible abduction of the bride before the time fixed for the marriage, is punishable; as is also a delay on the part of the family of the bride beyond the term fixed for concluding the marriage.<sup>29</sup>

A singular situation arises, if a *filius familias* enter a betrothal during his absence from his family, his grandfather, father, uncle or older cousin, *i.e.* a person in whose *patria*

26 Not so in Roman law, l. 14 D. de spons. (23, 1): in sponsalibus contrahendis aetas contrahentium definita non est, ut in matrimoniis—si non sint minores quam septem annos.

27 The same according to canonical law, but in contradistinction to Roman law l. 2 § 2 D. de div. et repud. (24, 2): in sponsalibus discutiendis placuit renuntiationem intervenire oportere—const. 2 C. de spons. (5, 1)—l. 134 D. de verb. oblig. (45, 1)—const. 2 C. de inutil. stipul. (8, 39); actio ex stipulatu.

28 The Roman law punished this with infamy, l. 1, l. 13, pr. § 1-4 D. de his qui not. inf. (3, 2); const. 18. C. ad leg. Jul. de adult. (9, 9).

29 According to Roman law an action could be entered for delay of marriage without reason over 2-3 years, const. 16 C. de episc. aud. (1, 4)—const. 2, 5. C. de sponsal. (5, 1). const. 2 C. de repud. (5, 17).

*potestas* he stands, having, in the meantime, chosen a bride for him, and having signed the contract. If the son have concluded marriage, the betrothal made by the head of the family is dissolved. Otherwise the contract made by his family takes precedence over the other made by him.

c.—DISSOLUTION OF BETROTHAL.

If after signing the contract it appears that false statements have been made by the family of the bride, then the contract is void, the presents are returned and the *pater familias* of the bride receives eighty blows. The punishment for a like fraud on the part of the bridegroom's family is more severe, and the bride keeps the presents. Should the fraud be discovered after marriage has been concluded, an action for divorce can be entered.

If the betrothal be dissolved before the conclusion of marriage, either through the death of bride or bridegroom, or through withdrawal of both parties (*repudium voluntarium*), or through an impediment to marriage just arisen, or only just come into notice, then the presents have to be returned. If the marriage be not concluded through the *repudium* of one party, the party innocent of the dissolution of the betrothal gets back or eventually keeps the presents.

The fact of bride or bridegroom having been punished for thefts or fornication gives a right to cancel the contract.

IV.—CONCLUSION OF MARRIAGE.

In China the church has nothing to do with the conclusion of marriage; neither are the usual ceremonies and festivities absolutely necessary for the conclusion of a *justum matrimonium*, as long as the *consensus matrimonialis* exists between those persons who sign the marriage contract.

At the time of the conclusion of the marriage the bridegroom gives to the father<sup>30</sup> of the bride the so-called marriage presents, which sometimes amount to thousands of taels. The conclusion of the marriage is therefore preceded by a purchase, which is no mere sham transaction like the Roman *coemptio*, but corresponds to the purchase of the ancient German laws and to that of the Jewish law.<sup>31</sup> By accepting the purchase money, the father of the bride sells and manumits his daughter to the bridegroom.

<sup>30</sup> The talmud says: the matrimonial purchase money belongs to the father. See Mayer l.c. II., p. 326.

<sup>31</sup> See Mayer l.c. II., 353.

When the marriage is celebrated ; the wife leaves her family for ever (出家 *ch'u chia*) and belongs from this time to the family of her husband,<sup>32</sup> i.e. she considers the parents of her husband as her own, and mourns for them legally a longer time than for her own parents.

Whilst the purchase of a wife is called marriage (娶妻 *ch'ü-ch'i*) the expression for the purchase of a concubine (立 or 買妾 *li or mai ch'ieh*) points to the inferiority of the action. The union is concluded without festivities.<sup>33</sup> The punishments for transgressions against the marriage laws in the case of concubines are less severe than in the case of a wife.

#### V.—RELATION OF HUSBAND AND WIFE TO EACH OTHER.

Through the marriage the wife becomes, as was the case according to the law before Justinian<sup>34</sup> not only *uxor*, but also comes into the *manus mariti*. "She therefore ceases to be *sui juris*, if she was it, and leaves the *patria potestas*, if she stood under it. At the same time she enters the agnatic union of her husband like an adopted daughter; and especially comes into the position of an agnatic sister to his agnatic children."<sup>35</sup>

It is in consequence of the way in which the wife comes into the power of her husband that she acquires very few rights with the marriage. Though she shares the rank and the position of her husband (as the Roman wives shared the *dignitas mariti*), she has no right to ask conjugal fidelity from her husband;<sup>36</sup> whilst she, by sinning against it, commits a heinous crime.<sup>37</sup>

It is a cause for divorce, if the wife beats her husband, but the husband has the right to inflict corporal punishment on her. He is however punishable, if by doing this he inflicts a wound; but he comes off with a mulct, if he and his wife are willing to divorce.

32 According to the Jewish law, the family of the mother is not called family. See Mayer l.c. II., p. 283.

33 The same with the Israelites: wives with nuptials and with marriage bond, concubines (*pillegesh*) without either; the same holds good for the Greek *pallax*; it is different, however, with the Roman *pellax*, l. 144 D. de verb. signif. (50, 16.)—Nov. 18 c. 5.

34 Mackeldey, Lehrbuch des röm. Rechts, 14th edition, vol. II., p. 266; comp. Gaj. Inst. § 49, § 108 ss., II § 86 ss.

35 Mackeldey, l.c. II., p. 274, note; Gaj. Inst. III. § 14, 24. Coll. XVI., § 6.

36 Unlike the Romans, Nov. 117 c. 9 § 5: liceat mulieri propter hanc etiam causam matrimonium dissolvere.

37 See Mackeldey l.c. II., p. 274.

The wife owes the husband implicit obedience, and is not allowed to leave the house without his permission. If she act against this, her husband may sell her to another as concubine.

Even after the death of her husband she remains in his family.<sup>38</sup>

The wife cannot possess property of her own, "everything she possessed before entering into the *manus* passes into the hands of her husband,"<sup>39</sup> so that even property inherited by her remains with the husband after the marriage has been dissolved.<sup>40</sup>

The questions therefore of *dos*, *parapherna*, *pacta dotalia* and *donatio inter virum et uxorem* exist in Chinese law just as little as in the ancient Roman law.

As the power of the husband is transferred after his death to his wife, the Roman *donatio propter nuptias*, and the Jewish Ketubah (marriage bond) are excluded from Chinese law.

With all his power the husband is not allowed to hire out his wife to prostitution,<sup>41</sup> although it sometimes happens that a man whose wife has not born a son and does not allow him to purchase a concubine, hires for a time the wife of another to get a son by her.

#### VI.—DISSOLUTION OF MARRIAGE.

Besides death and *maxima capitis diminutio* of husband or wife, divorce may be the cause of dissolution of marriage.

a.—A divorce *must* take place, if there exists an impediment to marriage or if the wife commits adultery. The husband has in this case the right to kill both adulterers, if he surprises them *in flagranti*.<sup>42</sup> If he does not kill the wife, she is punished according to law and then sold as a concubine, the purchase money for her being taken by the government. If the adulterer kills the husband, the wife is strangled.<sup>43</sup>

38 Similar the Roman law, l. 22 § 1 D. ad municip. et de incol. (50, 1): *vidua mulier amissi mariti domicilium retinet*.

39 See Mackeldey l.c. II., p. 275; Gaj. Inst. II. § 86 ss. III. § 82 ss. Ulp. XIX, § 18.

40 Gaj. Inst. II. § 98: *si quam in manum ut uxorem recipimus, ejus res ad nos transeunt*.

41 In Rome lenocinium facere was punished with infamy, l. 1, l. 4 § 2, 3 D. de his qui not. inf. (3, 2)—l. 43 § 6-9 D. de ritu nupt. (23, 2).

42 Compare Leviticus 20, 10.

43 L. 43 § 12, 13 D. de ritu nupt. (23, 2).



*b.*—A divorce *may* take place

- 1.—If both husband and wife are willing to dissolve the marriage ;
- 2.—If the wife leaves the house against the will of the husband. Should she marry whilst absent, she is to be strangled ;
- 3.—If the wife beats her husband ;
- 4.—If the marriage contract contained false statements ;
- 5.—If the wife has one of the following seven faults : barrenness, sensuality, want of filial piety towards the husband's parents, loquacity, thievishness, jealousy and distrust, incurable disease.

The husband is, however, obliged to keep her in spite of one or several of the above faults ; if she has kept the full term of mourning for three years after the death of his parents, or if his family, having been poor at the time of the conclusion of marriage, has since become wealthy, and, lastly, if the wife has no other relatives to whom she may return after divorce.

The effects of the dissolution of the marriage are the following : the marriage is considered as having never been concluded ; the wife returns to her family, the children remain with the father and the purchase money is given back to the husband, except in the case that the latter was the cause of the divorce.

Nothing is to be found in the Chinese laws regarding any offence on the part of the husband which gives to the wife the right to enter an action for divorce.

#### VII.—POLYGAMY.

As mentioned above the wife who maliciously leaves her husband and marries another in the lifetime of her husband, is strangled.

If in the lifetime of his first wife (妻 *ch'i*) the husband marries another (妻 *ch'i*, not a concubine 妾 *ch'ieh*, as he is allowed to have as many concubines as he likes), the marriage is void ; the wife returns to her family and her father keeps the purchase money, unless he knew of the existence of the first wife. In this case the money has to be paid to the government.

#### VIII.—SECOND NUPTIALS AND VIOLATION OF THE TIME OF MOURNING.

Remarriage of the husband is permitted even without delay after the death of the first wife. The widow, however,

against whose remarrying custom generally is opposed, has to mourn three years for her husband.

If the husband has abandoned his wife, she has at the end of three years to give notice to the competent magistrate, who may then give her the permission to marry again.

## B.—ON PATRIA POTESTAS.

### I.—GENERAL REMARKS.

As was the rule according to the Roman law of the time before Justinian, all persons, who depend on a *pater familias*, either grandfather, father, uncle, mother or husband, stand in China under *patria potestas*; such persons are therefore either the wives of the *pater familias* or his sons and daughters or more distant descendants on the male line. The *patria potestas* is the same as the *domini potestas*, the power of the master over his slaves, according to the ancient Roman law.

If a man has got a girl with child, he must marry her; in the case of his already having a wife, he must take her as a concubine. But in any case, even if he is prevented by death from marrying her, the child is considered his legitimate offspring.

Illegitimate children, who are not made legitimate *per subsequens matrimonium* (私子 *ssü-tzü*) and children of prostitutes (雜種子 *tsa-chung-tzü*, *vulgo quaesiti*) stand under the power of the mother, whose family name they bear.

### II.—ON THE RIGHTS OF BOTH PARENTS WITH REGARD TO THEIR CHILDREN.

The *patria potestas* over children, whether legitimate or adopted, is unlimited. The father, or after death the mother,<sup>44</sup> can do with them as he likes; he may not only chastise, but even sell, expose or kill them.<sup>45</sup> The latter occurs often enough, especially with girls, if the family is too poor to bring them up. Infanticide is not prohibited, but whenever it spreads too far, the officials issue proclamations against it. Moreover it is generally considered as blamable and the voice of the people

<sup>44</sup> Therefore not like Gaj. Inst. I. § 104.—§ 10 J. de adopt. (1, 11): *feminae—nec naturales liberos in sua potestate habent*; but the same as the law of the Visigoths, Mayer l c. II. p. 416.

<sup>45</sup> The same power was given the father by the Romans (§ 2 J. 1, 9; Gaj. Ins. I. § 55,) by the Gauls (Cæsar de Bell. Gall. VI., 19) and by the Visigoths (Mayer l c. II. p. 416, Lex Wisig. IV., 2 § 13).

is raised against persons, who carry the abuse of the father's power thus far.

The power of the father over his son does not cease as long as the father lives, unless the son enters the government service.<sup>46</sup> The father, wanting to exercise his rights over him, has to obtain first the assent of the Emperor.<sup>47</sup> Over the daughter the power of the father exists until she comes into the *manus* of a husband.<sup>48</sup> If the marriage is divorced, the daughter returns into the power of her father; as widow, however, she remains in the family of her husband.

### III.—ON THE RIGHTS OF THE HUSBAND WITH REGARD TO HIS WIFE.

THE wife follows her husband, wherever he likes to go and may not leave the house without his permission. The husband has the right to chastise his wife, but not to wound her (see above, the causes for a divorce).<sup>49</sup> He has not the right to kill her, except in the already mentioned case, that he surprises her *in flagranti delicto*.

### IV.—ON THE DUTIES OF THE CHILDREN TOWARDS THEIR PARENTS.

AS LONG as the parents live it is the duty of the children to show them reverence and obedience (孝順 *hsiao-shun*) and if necessary to nurse and support them.<sup>50</sup> The son shall, if father, mother or grand parents, are over eighty years old or feeble and ill, remain at home, unless another son over sixteen years old lives with them. This command is specially in force for officials. As long as parents, grandparents, or husband are in prison on account of a capital crime, the children, grandchildren and wife are not allowed to participate in festivities and amusements of any kind. Disobedience towards parents and grand-

46 *In publicis locis atque muneribus atque actionibus patrum jura cum filiorum qui in magistratu sunt potestatibus collata interquiescere paululum et connivere, etc.*, Aulus Gellius, Noctes II, 2, see Gibbon, Rome, chapt. XLIV. (ed. 1815 vol. VIII p. 54.)

47 The same according to the ancient German law, Mayer l.c. II. p. 443.

48 The same we find in the Israelitic law, Mayer l.c. II. p. 440.

49 According to the Mosaic law the husband was not allowed to cruelly illuse his wife, Mayer l.c. II. p. 382.

50 According to the Talmud (Kidushin 31a., Joreh deah 240 § 1 and 4) the children are obliged to honor, next to God, their father and mother the most, and to nurse and support them.

parents and deficient support of them is on the motion of the concerned severely punished.<sup>51</sup> Descendants are not allowed to enter an action against ascendants; they are not obliged to denounce crimes committed by them or to appear as witness against them. This exemption extends to all members of the same household, even to servants and slaves.

After the death of the parents it is the chief duty of the children to strictly keep the term fixed for mourning and to rigorously perform the sacrificial ceremonies on their graves. The coffin has to be buried, if at all feasible, in the native soil.<sup>52</sup>

#### V.—ACQUISITION OF PATRIA POTESTAS.

*Patria Potestas* may be acquired (a) through marriage, (b) through procreation, (c) through adoption, or (d) through purchase. If the person who acquires *patria potestas* in one of these four ways, stand himself under *patria potestas*, then he acquires it for his *pater familias*.

a.—*By Marriage*.—The wife belongs after marriage to the family of her husband, and stands in his, or in the *manus* of that person, under whose *patria potestas* the husband stands.

b.—*By Procreation*.—Children come under the *patria potestas* of their father, whether born by a wife or by a concubine.

c.—*By Adoption*.—To explain this institution, most important in Chinese law, we take the Roman law as a type.

A man may adopt a person as son or daughter; or if he formerly had sons, as grandchild, but not as brother, wife or concubine.<sup>53</sup> Ninety-nine per cent of all adoptions in China take place in childless families, and among these seventy per cent are adoptions of sons. Fifty per cent of all families in China possess adopted children (E. H. Parker).<sup>54</sup> The

51 According to Deuteronomy 21, 15; Leviticus 20, 9 and V. Moses 27, 16 even disesteem of the parents is to be punished by death.

52 How difficult this duty may sometimes be, was shown by the case of the late Taotai Fung, who went as far as Kansu in the North-west of China to fetch the coffin of his father and to bring it overland to Canton, his native province. The difficulties of this voyage, on which many ceremonies had to be performed, exhausted the son to such an extent that he succumbed when only half the voyage was completed. His brother took his place and continued, after the short delay prescribed by law, the voyage to Canton with the two coffins.

53 L. 37 pr. D. de adopt. (1, 7).

54 Compare the law of Menu IX., 127, 159; the Hindu considers it his religious duty, to have a son, by whose means he may pay off his debt to his forefathers. If he remains childless, he must adopt one.



same that is said with regard to the adoption of the ancient Greeks, holds good for the Chinese: "the dying out of a family was to be prevented, as by the desolation of the house the dead lost their religious honour, the gods of the family their sacrifices, the hearth its flame and the forefathers their name among the living."

Adoption, like marriage and the acquisition of slaves, rests in China upon purchase, about which a contract is made, in which only the words wife, son, daughter or slave are differently inserted. The most frequent case is the adoption of nephews by the childless uncle. But besides this direct adoption there is another way to procure descendants to such uncle. The nephew marries a concubine, and the children born by her are regarded as grandchildren of the uncle; whilst the children of the nephew's wife are the grandchildren of the nephew's father. The Chinese call this method 雙祧 *shuang-t'iao*.

It being prohibited in China for officials to hold office in their native province, adoption becomes the means of avoiding this restriction. The official in question is adopted into a family of another province, acquires a right of domicile in the province of his adopted parents, and may now hold an office in his original native province. In the same way confiscation of property is prevented by adoption, if such confiscation of property is imminent on account of the crimes of near relatives.

### 1—General Requirements of Adoption.

As the main idea of Chinese adoption may be stated, that only children may be adopted out of families, who bear the same family name; as otherwise, as the Chinese express it, the difference between families would soon cease to exist.

No special requirements are prescribed for the adopter, and the law fixes no age under which one may not adopt,<sup>55</sup> although it is usual, that the adopter is older than the person to be adopted. Foundlings under three years old may be adopted without further ceremony.

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<sup>55</sup> As is the case in Roman law, § 4 J. de adopt. (1,11): *minorem natu non posse majorem adoptare placet; adoptionem enim naturam imitatur et pro monstro est, ut maior sit filius quam pater. Debet itaque is qui sibi per adoptionem vel arrogationem filium facit, plena pubertate, id est XVIII annis praeecedere.* L. 40 § 1 D. de adopt. (1, 7).

It is permitted to emancipate the adopted, and to adopt him a second time.<sup>56</sup>

The wife, acquiring after the death of her husband his *patria potestas*, has therefore the right of adopting;<sup>57</sup> she has, however, to ask the consent of the nearest male relatives of her late husband, for adoption as well as for *datio in adoptionem*. She has further the right of preventing the legitimate or adopted sons of her husband, from giving themselves into arrogation against her wish.

It is not allowed to adopt one's younger brother or one's uncle, even if the latter is younger than the nephew; for the same reason the uncle may not adopt a nephew, who is older or of the same age as he is.

## 2.—*Special Requirements.* aa.—*Of Arrogation.*

Whoever wants to give himself into arrogation, must ask for the consent of the nearest male relatives of his former *pater familias*. If he has elder brothers alive, their consent must be asked. In the lifetime of his father the son may give himself, even without the consent of his father or his relatives, into arrogation, if the father is insane and poor, so that the son by the arrogation acquires the means to support him. If the father is far away, the son is allowed to be arrogated, but the father may, on his return, claim back his son.

## bb.—*Of the datio in Adoptionem.*

According to its nature the *datio in adoptionem* is properly speaking a sale (*venditio*), to which only the consent of the *pater familias* is required; the person to be adopted is not asked except he be a son holding office. In practice however it never happens, that an adult married son is sold into adoption against his own free will. The wife of the adopted follows her

56 Not so in Roman law, l. 37 §1 D. de adopt. (1, 7): eum quem quis adoptavit emancipatum vel in adoptionem datum iterum non potest adoptare.

57 The Roman wife had not this right, §10, J. de adopt. (1, 11): feminae quoque adoptare non possunt. Const. 5, C. de adopt. (8, 48); mulierem quidem quæ nec suos filios habet in potestate, arrogare non posse certum est. In Egypt this right was conceded to the wife, see Mayer l. c. II p. 427.

husband, but the children remain in the family of the *pater familias*.<sup>58</sup>

A man having sons of his own may not adopt a stranger as their elder brother, but he may adopt grandchildren as sons of his legitimate or adopted sons. After his death the latter have the right to dissolve such adoptions.

Brothers may, after the death of their parents, give their elder or younger sisters into adoption, but not without their consent.

Even after death a *filius posthumus* may be adopted for a person by his relatives or friends, in case that this person died without leaving male descendants. By special grace the Emperor may do this for princes or high dignitaries, but in all cases with the consent of the male relatives of the deceased.<sup>59</sup>

### 3.—*Effects of Arrogation and of Adoption.*

The effects are in either case the same.<sup>60</sup> The adopted becomes agnate of all agnates of the arrogator or of the adopter. The adopted son has altogether a better position than the natural one, as he cannot be sold without the consent of his natural parents, unless a second adoption be of real benefit to the child. He has all the rights of a son or a daughter. In the case of inheritance, natural as well as adopted sons take precedence before all daughters.<sup>61</sup> Should the adopter get sons born after the adoption so that the original cause for the adoption no longer exists, he may retrograde the adoption, if the parents are willing to take back the child. The child must be kept, however, if no member of his family lives, to whom he can return; only officials may thus be left without family.

58 According to Roman law the children of an arrogated person followed their father, the children of an adopted person remained with their grandfather, l. 2 §2 D. de adopt. (1, 7): *is qui liberos in potestate habet, si se arrogandum dederit, non solum ipse potestati arrogatoris subicitur, sed et liberi ejus in ejusdem fiunt potestate tamquam nepotes*. l. 40 pr. D. de adopt. (1, 7): *quod non similiter in adoptione contingit, nam nepotes ex eo in avi naturalis retinentur potestate*.—l. 26, 27 D. ibid: *ex adoptivo natus adoptivi locum obtinet in jure civili*.

59 This adoption after death was also known to the Greeks, Demosth. c. Makartat 1053, 12; Isæus e.d. Hagnias 298, Is. e. d. Apollod. 179 (Mayer l. c. II, p. 429).

60 Not so in Roman Law, l. 1 l. 23 D. de adopt. (1, 7).—§2 J. de adopt. (1, 11).—const. 10 pr. §5 C. de adopt. (8, 48).—pr. J. de adopt. (1, 11).—§13 J. de hered. (3, 1).

The adopted child being regarded as the real child of his adopted parents, these must give their consent, if the child wants to commence a three years' mourning after the death of his natural parents. An official is not allowed to mourn twice three years, but only for his adopted father, as mourning means in this case withdrawing for the time from the official life.

#### VI.—TERMINATION OF PATRIA POTESTAS.

With the death of the father, his power passes over to the mother, and after her death to the eldest son, who then has also power over his younger brothers and his elder and younger sisters.

##### *a.—Without the will of the Father.*

The father's power does not cease to exist in the lifetime of the father unless the son holds office. Except with the special permission of the emperor the father in this case cannot exercise his power over his son. As mentioned above, the son becomes *quasi sui juris*, if the father is insane and at the same time poor.

##### *b.—With the will of the Father.*

(Excepting the case of the father giving himself into arrogation, so that his children come under the power of his arrogator) the father's power may cease with the will of the father:—

1.—By sale into adoption, by which the son acquires agnate rights in the family of his adopted father;

2.—By sale of a daughter into marriage, she becoming an agnate in her husband's family and coming into his *manus*;

3.—By the permission to enter a religious order. The children then lose their family name and leave the family connection altogether (出家 *ch'u chia*);

4.—By exposing the children in the tender age. The finder may lawfully adopt them, if they are under three years of age.<sup>61</sup> If they are older than three years, it is prohibited to expose them; and only the ways mentioned under No. 1 and No. 3 are left to the father to rid himself of his child.

In contradiction to the Roman law<sup>62</sup> the father may dissolve his power even against the wish of his children.

61 See Alabaster, the law of inheritance, China Review vol. V p 191-195.

62 Const. 2, 4 C. de infant expos. (8, 52). Nov. 153 c. 1 (non gloss.)

63 Nov. 89 c. 11 pr.: solvere jus patriae potestatis invitis filiis non permissum est patribus.



An emancipation in the Roman sense, by which the emancipated person becomes *sui juris*, does not exist in China. After the death of the father, the daughter becomes *sui juris*, if she is widow and has children, the son only in case he has a family.

### C.—ON GUARDIANSHIP.

If at the time of the parents' death the children are still very young (under 7 years), and no head of the family exists who has *eo ipso* a right to the *patria potestas*, the fathers' power devolves upon one of the male relatives of the same name (同姓親戚 *t'ung hsing ch'in ch'i*), if no *testamentaria tutela* has been ordered. If no such relative exist, then one among the male relatives of a different family name (外姓親戚 *wai hsing ch'in ch'i*) is chosen. To be without any such relationship, is in China an impossibility. If after the father's death the mother is unwilling to take the responsibility of the *patria potestas* upon her, such guardian has to be appointed.

The guardian has the full *patria potestas* and keeps it, like the father, as long as he lives (with the above mentioned exceptions). The property of the child, of which the guardian has the full usufruct, continues to be the child's.





## ARTICLE IV.

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# THE STORY OF THE EMPEROR SHUN.

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BY THOS. W. KINGSMILL.

FOLLOWING the example of the Canon of Yaou that of Shun begins in a very similar manner—"According to tradition the ancient emperor (帝 Ti) Shun was called Ch'ûng-hwa." This name is equally inexplicable with the title similarly bestowed upon Yaou, if we simply look at the Chinese characters made use of. Taking them, however, as simple phonetics, and following the usual rules of phonetic change,<sup>1</sup> we find that it is in correspondence with Sanscrit Sûrya—the Sun in its glory.

Shun's own name tells us a similar story. He was introduced to Yaou (Varuna) as an unmarried man of the lower people called in, modern Chinese, Yu-shun; but the phonetic element in the former character 吳 points to *Wu* or *Vu* as the original pronunciation; and for the latter we find the sound *shun*, in 惇, *pure*, to *wash*, for instance, Sanscrit *snâ*; and 順, to *accord*, *complaisant*, Sanscrit *snu* to *flow*, etc., representing the inverted combination *sn*. WÛSNU or VU-SHNU we may, therefore, conclude was the most ancient pronunciation of the name, in other words Vishnu—the Lord of the Sun,—the wide-stepping, whose three paces comprehended in their fulness the earth, the atmosphere and the sky, in the successive forms of Agni, Vâyu and Sûrya.

How this corresponds with the mythical elements of the story I shall show further on.

The Chinese legends give us small information as to Wu-shun's antecedents. He was the son of Kûsow, literally, the blind old man, but whether to look upon this word as an

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<sup>1</sup> Cfr. *sur*, to shine, in Chinese 昌 *c'hang*, to illuminate, refulgent; 爽 *shwang*, light, sunny, pleasing. Hwa is simply phonetic representing *ya*.

appellative or a simple phonetic, neither the text or analogy seems to point out.<sup>2</sup> According to Mencius,—a good authority on the ancient myths of China, Wu-shun was born at Chû-fang (? Turvar), removed to Fu-hia (Harivārtha), and died at Ming-t'iaou, (Mandara of the Indian legends) the site also of T'ang ch'eng's battle in the Shang story. He was said to have been a man of the eastern tribes (I); as was Man-wang of the western.

The name Wu-shun has, of course, by the Chinese, been divided, and he is generally known as Shun of Yu or Wu; but apart from the violence done to the legend, which calls him distinctly one of the common people, there is no need to have recourse to this interpretation. The older commentators, including the preface to the Shoo-king, apparently speak of him simply as Wu-shun. Occasionally, as in the Shû-king, V., xx. 8, he is called simply Wu, so that it was a matter of accident which portion of the name would eventually become his personal appellation.

We may, therefore, content ourselves with receiving him as of concealed or unknown ancestry, and thereby save ourselves the necessity of enquiring, according to the fancy of the native commentators, by how many degrees of relationship he was removed from his predecessor Yaou. In this respect he resembles his analogue Vishnu in the Rigveda, who is as yet scarcely more than an abstraction, not having clothed himself with the personality of deity attributed to him in the Purânas. It was later in the Brâhmanas that Vishnu came to be classed with the Adityas or sons of Aditî, as great an abstraction apparently as Kûsow.

Like so many other manifestations as the solar deities, Wu-shun was not allowed to come into the world without molestation. His parents, we are told, hated him. Like Herakles he was to be set aside in favour of his half brother Siang (the Duplicate), and their main anxiety is to get rid of him. He is,

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<sup>2</sup> The Shi ki invents a genealogy for Shun. His father was Kû sow 瞽叟, Kû sow's father was 橋牛 K'iu ngo, K'iu ngo's 句望 Ko mong, Ko mong's 敬康 King k'ang, King k'ang's 窮輝 K'ung shan, K'ung shan's the emperor 帝 Chwan huk 顓頊 from whose father 昌意 Ch'ang i to Shun were thus seven generations. The genealogy is of the same value as that of the Hiung nû from Yü or the kings of Wû from T'ai Wang—zero.



therefore, ordered to plaster a granary, to which fire is set. Escaping from the fire, he is directed to dig a well, when at the bottom they attempt to fill it up. From these dangers he is, as becomes his character, miraculously preserved. His brother designs to possess himself of Wu-shun's peculiar attributes. "Let my parents," he says, "have his oxen and sheep; let them have his stone houses and granaries. His shield and his spear shall be mine; his lute shall be mine; his bow shall be mine; his two wives I shall make attend me to my bed. Siang then went into Shun's hall, and there was Shun on his couch playing on his lute."<sup>3</sup>

Wu-shun is set to plough in the channelled fields by the Lik shan, the word Lik itself denoting the path of the heavenly bodies.<sup>4</sup> His parents oppress him, and he cries in agony to High Heaven. His filial piety attracts notice. The emperor (Ti as before) Yaou sends his nine sons and his two daughters to wait on him, and multitudes of the scholars of the empire flock to him. He plays the potter (陶 t'ao) at the Thunder (Lui) Lake, or rather performs service (徭 yao) as the text apparently indicates. "His four limbs had not even a temporary rest, for his mouth and his belly he could not find pleasant food and warm clothing—sorrowfully came he to his death. Of all mortals never was one whose life was so worn out and embittered as his."

Such was the life of the hero whose fame now fills the pages of Chinese tradition.

He was, according to the orthodox tradition, called upon by Yaou when the latter was failing in power and influence to assist him in ruling the empire; but we find that he has little connection with the inundating waters, the management of which is still left to K'wan or Yü.

Other traditions differ from that generally accepted as to the relations between him and his predecessor. According to versions still current in the latter periods of the Djow dynasty he was rather the superseder than the simple coadjutor and helper, as finally the descendants of Herakles supersede the successors of Eurystheus on the throne of Mykenai. Ouranos, as representing the older gods has to give place to Kronos, so Yaou, his correlative has to yield the sceptre to Wushun. The Tso-

<sup>3</sup> Mencius V. I. II. 3.; Dr. Legge's translation.

<sup>4</sup> Cfr. Sanscrit laksh, *videre, observare*; lakshana, *nota, signum*.

chuen more than hints at the contrast between the two. The ancient emperors Kaou-yang and Kaou-sin had each eight worthy descendants who offered their services to Yaou; who was not able, adds apologetically the chuen, to raise them to office. No sooner did Wushun become Yaou's minister than he placed them in high positions, to reduce the earth to order, and to aid the influences of Heaven; to promote the proper duties of relationship, "so that in the empire was order, and beyond submission."<sup>5</sup> Four villains also lived in his time, apparently corresponding to those mentioned in the Shû, Hwantan, K'ung k'i, To ngat and T'o t'it, villains, slanderers, obstinate and greedy. Yaou could not find it in his heart to put them away, but when Wushun became minister and received the nobles from the four quarters, he banished these four wicked ones, thrusting them out into the four distant regions to resist the (goblin) Lîmî.

The Chinese euhemerists go beyond this. Some of them make Wushun dethrone Yaou and keep him a prisoner; raise Tanchû for a time to the throne, and then depose him, and thereafter allow no intercourse between father and son.

Turning to the Shûking we find in rough archaic metre, mixed with more modern prose, the orthodox account of Wushun's doings.

"Setting forth the excellencies of the five Canons

"The five Canons came to be observed

"Entering on the hundred rules<sup>6</sup>

"The hundred rules were punctually administered.

"Receiving his guests at the four portals.

"The four portals shone majestically.

"Entering on the great Loka<sup>7</sup>

"The impetuous winds, thunder and rain did not bewilder him.

"To him appertained the Siuenki (Chakra or Discus) and the jewelled Wang (Çangkha or Conch)

"By means of which he regulated the Seven Directors.

"He sacrificed to the gods above<sup>8</sup>

"He offered to the six Honoured Ones

"He sacrificed to the hills and streams

"He visited the host of spirits.

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<sup>5</sup> Ch'un t'siu VI. year 18.

<sup>6</sup> 揆 Kwei is the equivalent of Gr. *καὶρός*, *occasio*, *opportunitas temporis*.

<sup>7</sup> The great Loka (大 𩇛 *ta lok*) seems the equivalent of the Loka-loka of the Vishnu Purâna surrounding the golden mountain Meru.

<sup>8</sup> 上帝 Shang ti i.e. *dei superi*. 帝, used later for emperor, in old

- "In the second month eastward he performed his circuit  
 "As far as Tai tsung  
 "He offered burnt sacrifices to the hills and streams  
 "He did homage to the Regent of the East  
 "He harmonised the seasons and months, and regulated the day.  
 "He put in accord and fixed the meridians and parallels  
 "He regulated the five ceremonies."

Similarly at the other seasons he proceeded to the three other cardinal points represented by the remaining three Yoks, finally arriving at Ngai tsu he sacrificed? (用 yung) a bullock. "He laid the foundations of the twelve islands, piled up the twelve mountains, dug out the rivers."

He arranged the code of punishments "What reverence," adds the author, "that compassion should temper punishment." He banished Kung kung to the Dark Island (Yao or Yew-chow); drove Hwantow to Tsung-shan; hid Sam-miaou (Çambara) at Samwei; killed Kwan (κρόνος) at Mount Yu. The number of the villains here agrees with that in the Tso chuen, and some resemblance is evidently indicated in their names; Hwantan (*cfr.* Sans. Vandi *captivus*) is in the Tso-chuen made a descendant of Hwangti, K'ungk'i (*cfr.* Sans. garh *maledicere*) of Shaou haou; T'ongat of Chuen heuh; and T'o t'it of the officer Tsin yun. So in Indian legend Indra attended by his faithful comrade Vishnu "hurries off to encounter the hostile powers in the atmosphere who malevolently shut up the watery treasures in the clouds. These demons of drought called by a variety of names as Vrittra, Ahi, Çushna, Namuchi, Pipru, Çambara, Urana, &c., &c., armed on their side also with every variety of celestial artillery, attempt, but in vain, to resist the onset of the gods."<sup>9</sup>

But Çambara has a personal history connecting legend with myth. Rigveda VII, 99, &c. describing the powers of Vishnu connects him with the overthrow of Çambara, as does the Chinese legend Wushun with that of Sam-miaou, in a manner throwing much light in the Chinese myth. "No one, O divine Vishnu, who is being born, or who has been born, knows the furthest limit of thy greatness. Thou didst prop up the lofty and vast sky; thou didst uphold the eastern pinnacle

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Chinese had the value of deus, Sans. deva, with which it is etymologically connected. There is no trace in the Chinese classics of the form 上帝 being used in the sense of *Deus Supremus*.

<sup>9</sup> Muir's Original Sanscrit Texts, Vol. V. 94.

of the earth. Vishnu, thou didst prop asunder these two worlds; thou didst envelope the earth on every side with beams of light. Ye (Indra and Vishnu) have provided ample room for the sacrifice, producing the sun, the dawn and fire. Ye, O heroes, destroyed in the battles the wonderful powers of the hostile Vrishaçipra. Indra and Vishnu ye smote the ninety-nine strong cities of Çambara; together ye slew, unopposed, a thousand and a hundred heroes of the Asura Varchin."<sup>10</sup>

Çambara besides his mythical existence had moreover a legendary one, accounting for the second portion of his traditional name in Chinese. The Chinese commentators acknowledging the individuality of the object of the legend make him the prince of the Three Miaou, missing the phonetic form of the word as disguised by the Chinese characters. In the Indian legend, then, Çambara assumed flesh and blood as an ancient aboriginal king, a dark-skinned enemy, who dwelt forty years on the mountains and possessed a hundred impregnable cities. These cities were desired by Divodâsa who attacked them in vain; Indra came to his help and with Vishnu smote the cities and killed their ruler. In both legends exists the remembrance of a prehistoric combat with aboriginal tribes. Çambara lived in Udavraja, a country "into which the water flows" as Samwei, the latter syllable apparently corresponding to *Vraja* of the other, is mentioned in connection with the Yokshui, the Weak, or rather Dead Water of the Yukung.

To Greek mythology we must apparently go for the analogue of another portion of the story. The Canon of Yaou seems to hint at Kwan being the son of Yaou, as was Kronos of Ouranos. The jealousy evinced by Yaou of the other is not concealed. Kwan is grudgingly set to work to reduce the swelling waters. Kwan's rule, like that of Kronos, is not successful and he, like his analogue, is deposed in favour, tradition tells us, of his son; who finally succeeds in the person of Yü to the government of the Summer, 夏 Hia region, or rather apparently 霞 Hia the Bright, the kingdom of the gleaming Hari or Vishnu.

After twenty-eight years, i.e. passing through the twenty-eight lunar mansions, and so making a complete circuit of the heaven, the Emperor (Yaou) departed, the people mourning him for three years. Wushun proceeded to (the temple of) the

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10 Id. Vol. IV. 86.



accomplished ancestor on the first day of the first month. Assuming the power in his own person.

- "He traversed<sup>11</sup> the four Yok  
 "Burst open the four gates  
 "Permeated the four intelligences (聰).  
 "O, you twelve Herdsmen said he  
 "Provide our food in due season  
 "Be courteous to the distant and control the near.  
 "Honour the virtuous, confide in the good;  
 "Oppose the artful men,  
 "And the Man and I will follow submissively."

He following the example of his predecessor enquires of those around him for a capable minister. Bak, Lord, (Sanskrit *pūjā honor*, etc.) Yü (or Manu) is presented to regulate the waters and land. Yü does obeisance and wishes to decline in favour of Dsik (Daksha), Sit (Çesha), or Kaou yaou (Kuvera), but Wushun charges him to take the office.

He appoints Dsik to sow the ground for the Lîmin, (Agricultural or Aryan men;) Sit to instruct them in their civil duties; Kaou yaou to punish the evil doers. Siu to be superintendent of works; Yik (Vaksh) his general supervisor; I (? Sara) to preside over ceremonies; K'wei (? Garga) over music; Sung to be his mouth-piece.

The emperor said "O, ye twenty-two men be reverent according to the season, trusting to the merits of Heaven."

For thirty-three years Wushun occupies the throne, when the legend shows a diversity from the corresponding Indian story. Wushun desires to be relieved and calls on Yü to lead the people. In the Indian legend Manu is saved from the inundating waters by the interposition of Vishnu, who as a fish tows the ark in which the sage has taken refuge to the northern mountains, thence to descend and populate the earth. In Chinese story Yü or Manu himself takes an active part in draining off the water.

Yü declines the proposed honour in favour of Kaou-yaou, as one in whom the Lî (Aryan) men have confidence. Wushun praising Kaou-yaou's administration as minister of justice insists on Yü's acceptance, stating that in due time the appointment of Heaven will fall on him. Yü still declines and wishes to refer the matter to divination, but Wushun, having previously consulted the tortoise and the grass, refuses. Yü after pressing

<sup>11</sup> 徇 rather than 詢.

accepts, and receives the appointment at early dawn on the first day of the first month.

Wushun charges him to attack the chief of the Miaou (Çambara). For thirty years he carries on the contest but does not succeed, till Yik (Vach) advises Yü to withdraw his troops and try persuasion. In seventy days the prince comes to make submission.<sup>1 2</sup>

Scarcely inferior to Yü in the legend is the place occupied by Kaou yaou, and here the Greek version of the legend again comes to our assistance. Ploutôn the king of Hades cannot be separated from Ploutos the wealthy. So in the Indian story Kuvera is the god of wealth. "Hence," says Cox (*Aryan mythology* II. 319) "as containing the forms of all future harvests this unseen region becomes at once a land of boundless wealth, even if we take no thought of the gold, silver and other metals stored up in its secret places." Its king is the "wealthiest of all monarchs, and must be addressed not as Hades the unseen, but as Ploutôn the wealthy, the Kuvera of the Ramayana."

In the Chinese version we are not reminded of the wealth of Kaou-yaou, but the Shûking is full of his uncompromising justice. He employs, as minister of Wushun, the five punishments, and the five banishments with their several places of detention, for which three localities are assigned. He is closely associated with the Sze-yok; apparently the Ruler of Hades, though from similarity of sound seemingly confounded with the Sze-yok, the four sacred mountains.

Wushun in many other particulars recalls the legends of the west. Like his analogue he must be wived, and accordingly Yaou bestows on him his two daughters; a proceeding which seems unaccountable to the Chinese, but readily explained when we find that the legend is but one of a series, each marked by the same peculiarity. These names, we are told, were Wo wang the literal equivalent of Sanscrit Ahar the

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<sup>1 2</sup> Yik, the correlative of Vach the goddess of speech, equivalent to the Greek Peitho, appears here in his natural character. Like Vach Yik has other parts to fill. He is, above, the lieutenant of Wushun, calculating and selecting, and having authority over all living things (grass, trees, birds and beasts). In a somewhat similar capacity, while Yü drains off the waters Yik teaches the people to eat flesh. So Vach is instrumental as the helpmate of Prajâpati in the creation of all things, traversing and pervading the universe.

day, and Nüying apparently connected with Nύξ, Nakta, the night; both naturally daughters of Ouranos, the overarching heaven. So Herakles is matched with the fifty daughters of Thespius, and Appollôn pursues the gentle Daphne nor is constant to her. The Hindoo legends of Krishna and the maidens recall the same tale of the ever vivifying sun.

The Chinese myth is, however, broken off abruptly by the entrance of Yü on the scene. The celestials (Ti) give place to the human progenitor of the race, and Yü and his successors appear as simple Wang's. Hence Wushun's son Shang K'iu'en retires into obscurity.

Nor do we learn much of the death of Wushun. The halo surrounding the departure of Herakles is not here repeated. He ascended, we learn, to the upper regions and there died. Before his death he dwelt in Ming ti'aou, *i. e.* Mandara one of the buttresses of the golden mountain Meru, and died in Mount Tsang-wu, the Sringi of the Indian cosmogony.

Indeed nothing is more conclusive as to the extra-Chinese origin of the early legends than the evident coincidence of the geography of the Chinese stories and that of Indian tradition. The Vishnu Purâna gives a scheme of cosmography in which we can detect many resemblances too close to be occidental. In the centre of the universe is the golden mountain Meru, the Mûng of the Yûkung. North lie mounts Nila, Sweta and Sringi, the latter the place of Wushun's decease. South we have Himavat, Himakûta and Nishadha. Between the ranges we have the different varthas; Bhârata; Kunpurusha; Harivartha, Fuhia of Wushun; and north of Meru, Ramyaka; Hiranyuga and Uttarakuru.

Butressing Meru are to the east Mandara, Mingti'aou of the legend, famous again as the site of T'ang ch'eng's great battle; south, Gandhamâduna; west, Vipula; and north Saparvça, from which flow respectively the four rivers Çitâ, Alakananda, Chaksu and Bhadra.

The attributes of Wushun are equally clear. The Siuen-ki, revolving disk, and the Yuk hang, gemmous balance, tell themselves of the discus and conch of Vishnu. His shield and spear, lute and bow are as characteristic of Appollôn or Krishna as of the Chinese hero. Strangely enough he is absent from the Book of Poetry. Wu wang and Chow kung in it adorn the dawn legends of the conquering race. Wushun in fact appears to have belonged more especially to the elder Aryan tribes who

had effected a settlement before the battle of Múkye gave the opportunity of founding the first Chinese kingdom; and the legend was probably worked into the tangled net of so called Chinese history, when the policy of the Chows dictated an amalgamation of all the immigrant tribes to found the first Chinese empire.

If any trace of legend, characterizing by that term the first remembrance of actual events as opposed to myth, still survived at that period, it has long disappeared. The tale of Wu shun affords no historic ground to assist in building up the fabric of history. Our messenger sent forth most fain return, for the swelling waters of forgetfulness still prevail, and in the words of the Shúking overtop the mountains.

Next, however, to reconstructing history is the advantage of shattering false beliefs. The unquestioning faith placed in the credibility of the so called early records of China has not a little tended to confuse our notions of early history. It is at least something to know that beyond a certain point we cannot go. The very knowledge that the early stories were myths, and the experience gained in comparing them with their analogues, will serve us in good stead when we come to enquire what light is really thrown on the early history of mankind by the archaic records of China.

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JOURNAL  
OF THE  
NORTH-CHINA BRANCH  
OF THE  
ROYAL ASIATIC SOCIETY.

1879.

NEW SERIES, No. XIV.

AGENTS FOR THE SALE OF THE SOCIETY'S PUBLICATIONS :

*Shanghai, Yokohama, and Hongkong:* MESSRS. KELLY & WALSH.

*London:* MESSRS. TRÜBNER & Co., 57 and 59, Ludgate Hill.

*Paris:* M. ERNEST LEROUX, Rue Bonaparte, No. 28.



## CONTENTS.

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	PAGES.
Report of the Council for the year 1879 .....	i
List of Members .....	iii
Treasurer's Report .....	vii
Librarian's Report .....	xi
ARTICLE I.—The Intercourse of China with Central and Western Asia in the Second Century B.C., by T. W. Kingsmill, Esq. ....	1
ARTICLE II.—Rock Inscriptions at the North side of Yentai Hill, by J. Rhein, Esq. ....	31
ARTICLE III.—Siamese Coinage, by Joseph Haas, Esq.....	35





REPORT  
OF THE  
COUNCIL OF THE NORTH-CHINA BRANCH  
OF THE  
*Royal Asiatic Society,*  
FOR THE YEAR 1879.

At the Annual Meeting, held the 3rd of February, the following gentlemen were elected Office Bearers for the year 1879, viz:—

T. W. KINGSMILL, Esq.,	<i>President.</i>	
J. MCLEAVY BROWN, Esq.,		} <i>Vice-Presidents.</i>
P. G. VON MOLLENDORFF, Esq.,		
G. G. LOWDER, Esq.,	<i>Secretary.</i>	
F. HIRTH, Esq., Ph.D.,	<i>Librarian.</i>	
A. STRIPLING, Esq.,	<i>Treasurer.</i>	
A. A. FAUVEL, Esq.,	<i>Curator.</i>	
D. J. MACGOWAN, Esq., M.D.		} <i>Councillors.</i>
F. B. FORBES, Esq.,		
H. BAILEY, Esq.,		
A. KRAUSS, Esq.,		
J. HAAS, Esq.,		
T. G. SMITH, Esq.,		

During the year only two meetings have been held, on which occasions the following papers were read:—

1.—Ethnology in Eastern Asia, by T. W. Kingsmill, Esq.

2.—Siamese Coins, by Joseph Haas, Esq.

The absence of many members of the Society and the consequent lack of papers were the cause that the meetings have been rather few this year. It is to be hoped, however, that the new year upon which the Society is now about to enter, may be a beneficial one for the increase of science, especially in regard

to this great Empire, the knowledge of which it is the principle object of the Society to promote and cultivate.

Last year the Society had to mourn the loss of three of its members, this year, again, two deaths have occurred : those of Mr. O. D. Crawford and Dr. P. E. Galle, who for many years were members of the Society.

In the course of the year six resident and two non-resident members have been elected, while six gentlemen have resigned their membership.

The publication of the Society's journal has been entrusted to the hands of Messrs. Kingsmill and Haas, and will appear shortly.

The Curator was not able to publish a Report, owing to his sudden departure from Shanghai. However, with the exception of a very valuable and most carefully arranged collection of stones presented by Dr. Guppy, very few additions have been made to the Museum.

We take this opportunity to offer once more our best thanks to the English and French Municipalities for the most liberal grants extended by them in aid of the Museum, and we hope that they will continue their support for the coming year.

The list of members of the society is herewith subjoined.

The report of the Treasurer is also appended.

The Secretary of the Society having been obliged to leave for Europe through ill-health, his functions have been entrusted by the committee to the undersigned during his temporary stay in Shanghai.

J. RHEIN,

*Hon. Secretary, pro tem.*

# LIST OF MEMBERS.

(MAY 1880.)

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## HONORARY.

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His Majesty LEOPOLD II., King of the Belgians.

Alcock, Sir Rutherford, K.C.B., London.  
Hart, Robert, Esq., C.M.G., Peking.  
Legge, Rev. J., D.D., L.L.D., Oxford.  
Medhurst, Sir Walter H., K.C.B., London.  
Parkes, Sir Harry S., K.C.B., Tokio.  
Pereira, A. F. Marques, Esq., Bangkok.  
Robertson, Sir D. Brooke, C.B., London.  
Seward, His Ex. George F., Peking.  
Shadwell, Admiral Sir Charles F. A., K.C.B., Melksham, Wilts.  
Wade, Sir Thomas F., K.C.B., Peking.  
Williams, Rev. S. Wells, L.L.D., Yale, U.S.  
Wylie, Alex., Esq., London.  
Yule, Col. H., C.B., London.

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## .CORRESPONDING.

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Bastian, Dr. A., Bremen.  
Brown, Rev. S. R., D.D., Yokohama.  
Cox, Rev. Josiah, ——.  
Delaplace, Mgr. L.G., Peking.  
Edkins, Rev. J., D.D., Peking.  
Fryer, John, Esq.  
Gordon, Col., England.  
Griffith, Rev. John, Hankow.  
Hance, H. F., Esq., PH. D., Canton.  
Happer, Rev. A. P., D.D., Canton.  
Hepburn, J. C., Esq., M.D., Yokohama.  
Keischke, Dr. Jto, ——.

Lindau, Rudolph, Esq., ——.  
 Lockhart W., Esq., M.D., London.  
 Macgowan, D. J., Esq., M.D.  
 Martin, Rev. W. A. P., D.D., L.L.D., Peking.  
 McCartee, D. B., Esq., M.D., Tokio.  
 McClatchie, Rev. Thos., M.A.  
 Moule, Rev. G. E., Hangechow, (absent.)  
 Muirhead, Rev. W.  
 Schereschewsky, Rt. Rev. S.I.J., D.D.  
 Silveira, Lieut. F. da, ——.  
 Williamson, Rev. A., L.L.D., Chefoo, (absent.)

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## RESIDENT.

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Boleslawski, Chevalier C. de.	Little, A. J., Esq.
Bryner, J., Esq.	Low, E. G., Esq.
Butcher, Very Rev. C. H., D.D.	Maclay, R. H., Esq.
Christiernsson, Dr. B.	Maignan, H., Esq.
Dülberg, F. W. E., Esq.	Pichon, L., Esq., M.D.
Forbes, F. B., Esq.	Rivington, Charles, Esq.
Grant, P. V., Esq.	Rocher, E., Esq.
Gubbay, R. A., Esq.	Ruegg, E., Esq., PH. D.
Haas, J., Esq.	Samson, J., Esq.
Hague, E. P., Esq.	Saunders, W., Esq.
Henderson, Ed., Esq., M.D.	Schmidt, C., Esq.
Hippisley, A. E., Esq.	Schultz, Lieut. C. A.
Hosie, Alex., Esq., M.A.	Shinagawa, E., Esq.
How, A. J., Esq.	Sim, Alexander, Esq.
Hübbe, P. G., Esq.	Slevogt, M., Esq.
Jansen, D. C., Esq.	Stripling, A. B., Esq.
Johnston, J., Esq., M.D.	Tata, D. B., Esq.
Kingsmill, T. W., Esq.	Wetmore, W. S., Esq.
Kleinwächter, G. H. J., Esq.	Whitty, Chas. D., Esq.
Knight, F. P., Esq.	Wood, A. G., Esq.
Krauss, A., Esq.	Youd, F., Esq.



NON-RESIDENT.

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Alford, R. G., Esq., Hongkong.  
Allen, E. L. B., Esq., Foochow.  
Allen, H. J., Esq., Newchwang.  
Ayrton, W. S., Esq., Hankow.  
Baber, E. C., Esq., Chungking.  
Bandinel, J. J. F., Esq., Newchwang.  
Bailey, David H., Esq., U. S.  
Brenan, B., Esq., Peking.  
Bristow, H. B., Esq., Tientsin.  
Brown, J. McLeavy, Esq., Shanghai, (absent.)  
Bushell, S. W., Esq., M. D., Peking.  
Coignet,—Esq., Japan.  
Cooper, W. M., Esq., Ningpo.  
Cordes, August C., Esq., Hamburg.  
Coughtrie, J. B., Esq., Hongkong.  
Davenport, A., Esq., England.  
Deighton-Braysher, C., Esq., Newchwang.  
Dennys, H. L., Esq., Hongkong.  
Dodd, J., Esq., Amoy.  
Eitel, Rev. E. J., PH. D., Hongkong.  
Farago, E., Esq., Ichang.  
Fauvel, A. A., Esq., Shanghai, (absent.)  
Ferguson, His Ex., J. H., Peking, (absent.)  
Fergusson, T. T., Esq., Chefoo.  
Fisher, H. J., Esq., Keelung.  
Frater, Alex., Esq., England.  
Fritsche, H., Esq., PH. D., Peking.  
Gardner, C. T., Esq., Chefoo.  
Giquel, P., Esq., Paris.  
Glover, G. B., Esq., Kiukiang.  
Gottburg, W., Esq., M. D., Berlin.  
Hanbury, T., Esq., England.  
Henderson, J., Esq., Tientsin.  
Hirth, F., Esq., PH. D., Shanghai, (absent.)  
Hobson, H. E., Esq., Amoy, (absent.)  
Jamieson, G., Esq., England.

Johnson, F. B., Esq., London.  
Kleinwächter, F., Esq., Chinkiang.  
Kopsch, H., Esq., Kiukiang, (absent.)  
Krey, W., Esq., Jchang, (absent.)  
Little, L. S., Esq., M. D., Shanghai, (absent.)  
Lowder, G. G., Esq., Shanghai, (absent.)  
Mangum, W. P., Esq., Nagasaki.  
McClatchie, H. P., Esq., England.  
Möllendorff, O. von, Esq., PH. D., Tientsin, (absent.)  
Möllendorff, P. G. von, Esq., Peking.  
Morris, Herbert S., Esq., England.  
Owen, Rev. G. S., Peking.  
Parker, E. H., Esq., Canton.  
Pitman, J., Esq., Tokio.  
Plancy, V. Collin de, Esq., Peking.  
Reid, David, Esq., England.  
Rhein, J., Esq., Peking.  
Russell, The Hon. James, Hongkong, (absent.)  
Ryrie, The Hon. Phineas, Hongkong.  
Sampson, T., Esq., Canton.  
Schulze, Capt. F. W., Coast.  
Smith, The Hon. Cecil C., Singapore.  
Starkey, Reg. D., Esq., Hongkong,  
Stent, G. C., Esq., Wenchow.  
Stuhlmann, C. C., Esq., Kiukiang.  
Sutherland, H., Esq., Foochow.  
Watters, T., Esq., Ichang.  
White, F. W., Esq., Hankow.  
Wicking, H., Esq., Hongkong.  
Wilcox, R. C., Esq., Hongkong.

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## TREASURER REPORT.

*To the President and Committee of the*

NORTH-CHINA BRANCH OF THE ROYAL ASIATIC SOCIETY,  
Shanghai.

GENTLEMEN,

ALTHOUGH the Statements of Accounts of the North China Branch of the Royal Asiatic Society and Shanghai Museum for the year 1879, which I have now the honour to submit to you, show the details of all receipts and disbursements; a few remarks will perhaps help to a better understanding of the financial position of the Society and Museum.

It will be observed that the gross receipts of the Society for the year just closed amounted to \$969.88 and the disbursements to \$987.15, including \$409.36 for Journal for 1878, and \$107.64 due the Hon. Treasurer for same year, in all \$517, thus reducing the actual disbursements, for current expenditure for 1879, to \$470.15. The deficit, amounting to \$17.27, is more than covered by the amount credited to the Shanghai Library and Museum.

Subscriptions for the past year have been collected from forty-eight resident and thirty-three non-resident members. From the latter class there is still due about \$160, which have not yet being received. The Society have no outstanding liabilities, and the arrears of subscriptions may be looked upon as a balance in favour of the Society.

As regards the Museum, the income for the past year amounted to \$875.91; the disbursements for current expenditure to \$686.24. The remainder, amounting to \$189.67 shown as transferred to the account of the North China Branch of the Royal Asiatic Society, balances the two sides of the Accounts.

The total outstanding liabilities of the Museum, on the 31st December last, amount to Tls. 273.45, made up as follows:—

To Recreation Fund Interest on Loan of Tls. 1,500, two years at 5 per cent per annum .....	Tls. 150.00
To Shanghai Library Rent of Museum for six months ending 31st December, 1879 .....	Tls. 75.00
To W. B. Pryer, Esq., Sundry Expenses for Museum due since 1875, \$51.39 .....	Tls. 37.37
To North China Branch of the Royal Asiatic Society, Balance due on Rent Account, \$15.33.....	Tls. 11.08
	Tls. 273.45

These figures are sufficient to prove that the Museum is in want of funds, and it is to be hoped that the annual grant of Tls. 500 given by the Municipal Council North of Yang-king-pang, and Tls 100 by the French Municipal Council, will be continued.

ALFRED B. STRIPLING,

*Hon. Treasurer.*



**BALANCE SHEET OF THE**  
**North-China Branch of the Royal Asiatic Society,**  
**FOR THE YEAR 1879.**

RECEIPTS.		DISBURSEMENTS.	
\$	c.	\$	c.
To Cash from Hon. Treasurer for 1878 .....		By Amt. paid to Hon. Treasurer for 1878 .....	
" Subscription for 1879 .....	645	" Amount paid to Printing Account for Journal for 1878.....	107 64
" Donation from Dr. Fritsche .....	61 30		36
" Kelly & Walsh sales of Journals .....	26 35	" Printing Journal for 1878 .....	305
" Honorary Treasurer Shanghai Library for External Repairs Tls. 19.50 .....	26 67	" Fire Insurance Tls. 44.....	60 19
" R. E. Wainwright, Esq., for use of Meeting Room, Tls. 15 .....	20 41	" Municipal Taxes Tls. 4.35 .....	5 95
" Museum Fund (for Rent of Museum from 1st July 1877 to 30th June 1878), on account. ....	189 67	" External Repairs, Tls. 9.75.....	13 34
" Hon. Treasurer, Balance due...	17 27	" " repaid by Hon. Treasurer Shanghai Library, Tls. 19.50 .....	26 67
		" Municipal Taxes to be repaid by Hon. Treasurer Shanghai Library, Tls. 8.71.....	11 91
		" Packing Case for Journals .....	1 44
		" Freight of Journals to England Tls. 7 .....	9 44
		" Advertisements .....	5 89
		" Stationery .....	6 90
		" Wages, Coolie .....	8
		" " Shroff .....	10
		" Postage .....	4 46
		" Gas .....	1 40
			470 15
			<u>\$987 15</u>

Audited and found correct,  
**JOSEPH HAAS,**  
**J. RHEIN.**

**E. & O. E.**

**ALFRED B. STRIPLING,**  
*Hon Treasurer.*

**BALANCE SHEET OF THE  
Museum Fund of the North-China Branch of the Royal Asiatic Society,  
FOR THE YEAR 1879.**

RECEIPTS.		DISBURSEMENTS.	
\$	c.	\$	c.
To Cash from Hon. Treasurer for 1878, Tls. 40. <sup>20</sup> / <sub>100</sub> .....	55	By Wages, Taxidermist for December 1878.....	20
Grant of Municipal Council North of the Yang-king-pang, Tls. 500 .....	683 99	" Sundry Expenses, for Dec. 1878 .....	5 65
" Grant of French Municipal Council, Tls. 100 .....	136 80	" Rent for 12 months ending 30th June 1879 Tls. 150. ....	205 20
		" Wages, Taxidermist for 12 months, ending 31st December 1879, at \$20 per mensem .....	
		" Wages, Coolie 8 months at \$5 per mensem .....	40
	820 79	" Incidental Expenses for year ending 31st Dec. 1879 .....	85 55
		" Fire Insurance, Tls. 8 .....	10 94
		" External Repairs, Tls. 9.75 ..	13 34
		" Municipal Taxes Tls. 4.36 .....	5 96
		" Glass Case .....	32
		" 5 Packing Cases .....	9
		" 4 Frames .....	5 60
		" 100 Bird Stands .....	13
		" N.-C. B. of the R. A. Society (for Rent of Museum from 1st July 1877 to 30th June 1878), on account .....	455 39
			189 67
			<u>\$875 91</u>

Audited and found correct,  
JOSEPH HASS,  
J. RHEIN

E. & O. E.

ALFRED B. STRIPLING,  
Hon. Treasurer

## LIBRARIAN'S REPORT.

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The stock of publications added to our Library during the past year again consists entirely of the donations of books received from other societies, public institutions, etc., and presented by private individuals. I subjoin a list of the books so received.

No new books have been purchased, although the Library is now in a somewhat backward state, and threatens to become more and more a collection of books on the most heterogeneous subjects having assembled in the same room by accident, instead of being what is ought to be,—an establishment facilitating reference to the principal literary material, of the past as well as of the present day, relating to China and the Far East.

It has been the practice, it seems, not to make purchases in anticipation of gifts from the authors of the new books. Thus purchases of works of mark were postponed, and, after a number of years had elapsed since their first appearance, lost sight of altogether. The result is a number of important *lacanae* in our collection, the filling up of which I would recommend to be taken in hand as early and as often as the financial position of the Society will permit, the number of important books *not* presented, though wanted for the completion of our collection, accumulating year by year.

During the short time I have been in charge of the Library, I have had ample opportunity to observe two important defects. The one is that the Library is a great deal too sparingly used by the members of the Society; the other, that it is, or has been formerly, used in a somewhat disorderly, not to say unconscientious, manner. A thorough overhaul will show that a number of books duly catalogued is missing, without any record of their whereabouts,—the result, no doubt, of the practice of taking out books in the absence of, and without afterwards returning them to, the Librarian.

It seems that the existence of an honorary librarian is no sufficient guarantee against this malpractice. It will be found impossible by almost anyone who may unite this post with the more bulky duties of his daily pursuit, to be always in attendance when books are taken out by members; nor is it always convenient to accompany those who wish to consult books on the premises; moreover, the library room has to be cleaned and aired from time to time by Chinese servants, and is it not often that an honorary librarian will find time to superintend such access to his treasure on the part of irresponsible people in person.

It is chiefly for this reason that the proposal has been made to move the Shanghai Library Committee, if convenient, to take over the administration of the Asiatic Library in consideration of permission being given to the members of the Shanghai Library to use it for purposes of reference or reading on the premises. As the Asiatic Library could easily be kept in a separate room, say, the present lecture room, when meetings might be held upstairs, and would continue to be the sole property of the Asiatic Society, I should say that the acceptance of such a proposal would benefit both the interests of the Society and the Shanghai Library. There can be no doubt that the present librarians of the last-named library, being professionally engaged in that work, would be much better qualified to see that books are easily used and are accessible at regular hours, while keeping their issue to members of the Asiatic Society, and their return in due course in proper order, than a member of our Council, not living on the premises, and not being able to attend to the Society's business at any time he may be called upon to do so.

I avail myself of this opportunity to strongly recommend the adoption of such a plan, the advisability of which may not at once seem plausible to members not immediately connected with the administration of our books; but has forcibly attracted the attention of myself and Mr. Haas, who, having been librarian himself, has paid particular attention to the subject.

F. HIRTH,

*Hon. Librarian.*



LIST OF WORKS PRESENTED TO THE LIBRARY OF THE  
NORTH-CHINA BRANCH OF THE ROYAL ASIATIC  
SOCEITY DURING THE YEAR 1879 AND UP TO  
DATE, 4TH MARCH, 1880.

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1. Complete sets of the publications issued from the Inspectorate General of Customs, Statistical Department, viz :—  
Returns of Trade, 1878, Parts I. and II., English Version.  
Returns of Trade, 1878, Chinese Version.  
Customs Gazette, Nos. 40 to 44.  
Medical Reports, 16th and 17th Issues.  
List of Lights, Buoys, and Beacons for 1879, English Version.  
List of Lights, Buoys, and Beacons for 1879, Chinese Version.
2. Journal of the Royal Asiatic Society, New Series, Vol. XI, Parts I. and II.
3. Proceedings of the Royal Society, Vol. XXVI, No. 184 ; Vol. XXVII, Nos. 185-189 ; Vol. XXVIII, Nos. 190-196.
4. Journal of the Royal Geographical Society, Vol. XLVIII, 1878.
5. Proceedings of the Royal Geographical Society, Vol. XXII, Nos. 4-6 (1878) ; New Monthly Series, Vol. I, Nos. 1-10 (Jan. to Oct., 1879.)
6. Journal of the Statistical Society of London, Vol. XLI., Parts II., III., and IV. (1878) ; Vol. XLII., Parts I. and II.
7. Statistical Society of London : List of Fellows, 1879.
8. Proceedings of the Zoological Society of London, 1878 : Parts II. and IV. ; 1879 : Parts I. and II.
9. Quarterly Journal of the Geological Society of London, 1878 ; Nos. 135 and 136 ; 1879 : 137-139.
10. List of the Geological Society of London, 1878.
11. Smithsonian Report, 1877.
12. Essex Institute Historical Collections, Vol. XIV, Nos. 1-4.
13. U. S. Court Survey, 1874 and 1875.
14. Transactions of the Asiatic Society of Japan, Vol. VII., Parts III (two copies) and IV ; Vol. VIII Part I.
15. Geological Survey of Japan : Reports of Progress for 1878 and 1879 ; By Benjamin Smith Lyman.

16. Zeitschrift der Deutschen Morgenländischen Gesellschaft, 1876: Vol. I-IV.; 1877: Vol. I-IV; 1878: Vol. I-IV; 1879: Vol. I and II.
17. Monatsbericht der Kgl. preuss. Akademie der Wissenschaften zu Berlin. Jan., Febr., März, April, Mai, June, Juli, August, 1879.
18. Sitzungsberichte der philos.—philol. u. histor. Classe der K. B. Akademie der Wissenschaften zu München, 1877: Heft 3 and 4; 1878: Heft 1-4.
19. Sitzungsberichte der math.—physik. Classe der K. B. Akademie der Wissenschaften zu München, 1877: Heft 3; 1878: Heft 1-3.
20. Almanach der K. B. Akademie der Wissenschaften [München]: 1878.
21. Jahresbericht (XIII and XIV) der Vereins für Erdkunde zu Dresden, 1877.
22. Verhandlungen der K. K. zoologisch-botanischen Gesellschaft in Wien. Vol. XXVIII, 1879.
23. Jahrbuch der K. K. Geologischen Reichsanstalt, Vol. XXVIII, Jan.—Juni, 1878.
24. Oesterreichische Monatsschrift für den Orient, 1879.
25. Bulletin de la Société de Géographie [Paris], 1879: Mars, Avril, Mai, Juillet, Août, Septembre, Octobre, Novembre.
26. Annuaire de la Société des Études Japonaises par L. Bastide. Paris, 1879.
27. Atti della R. Accademia dei Lincei. Transunti, Vol. III, fasc. 1-7. Roma, 1879, 4to.
28. Cosmos di Guido Cora. Vol. IV, 1877, No. 2; Vol. V, 1878: Nos. 4, 5, 6, and 7.
29. Boletín del Ministerio de Fomento de la Rep. Mexicana: Sección Astronómica, 1879.
30. Bijdragen tot de Taal-Land-en Volkenkunde van Nederlandsch-Indië. Vierde Volgreeks: I, 2 en 3; II, 1-3.
31. J. J. Meinsma, Babad Janah Djawi, in proza's Gravenhage, 1877.
32. H. C. Humme, Abiāsā, een Javaansch Tooneelstuk. 's Gravenhage, 1878.
33. W. P. van den Broek, Javaansche Vertellingen. 's Gravenhage, 1878.
34. Tijdschrift voor Indische Taal—Land-en Volkenkunde, 1878: XXV., 1, 2 en 3 [two copies].

35. Notulen van de Algemeene en Bestuurs-vergaderingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen. Deel XVII, 1879, No. 1.
36. Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen. Deel XXXIX, No. 1, 1877, containing: W. P. Groenefeldt's Notes on the Malay Archipelago and Malacca.
37. Dr. A. Spengel, Ueber die lateinische Komödie. München, 1878.
38. Dr. Ad. Baeyer, Ueber die chemische Synthese. München, 1878.
39. A. Wylie, the Mongol Astronomical Instruments in Peking. Leide, 1878.
40. F. Scherzer, la Puissance Paternelle en Chine. Paris, 1878.
41. P. G. von Möllendorff, the Family Law of the Chinese. Shanghai, 1879.
42. F. W. Schulze, on Periodical Change of Terrestrial Magnetism. Shanghai, 1879.
43. J. J. Henderson, LL.B., an International Court for China. Shanghai, 1879.
44. T. Watters, a Guide to the Tablets in a Temple of Confucius. Shanghai, 1879.
45. Sketch of the Life and Contributions to Science of Prof. J. Henry, LL.D. [Secretary of Smithsonian Institution]. Seven copies.
46. N. Sionffi, Catalogue (?): Dynastie des Mogols, etc., Mossoul, October-December, 1879.
47. F. Jimenez y L. Fernandez, Determinacion de la Longitud del Péndulo, etc., en México. México, 1879.
48. Shanghai Municipal Council Report, 1878, with sundry Municipal papers.
49. Annual Report of the Astor Library, A.D. 1878.
50. Trübner's American and Oriental Record, Nos. 138-42.





JOURNAL  
OF THE  
NORTH-CHINA BRANCH  
OF THE  
ROYAL ASIATIC SOCIETY.

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ARTICLE I.

---

THE INTERCOURSE OF CHINA WITH CENTRAL AND  
WESTERN ASIA IN THE 2ND CENTURY B.C.

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(By T. W. KINGSMILL, Esq.)

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INTRODUCTORY.

The period to which the following notes refer is one of considerable historic interest. In the Far East the Emperor Wû-ti, the most enterprising of the Han dynasty, having broken the power of the Turkish Empire of the Hiung-nû, *i.e.* Kara-Nirus, was engaged in strengthening the internal administration of China, and in extending its influence abroad. In the West the Romans had, B.C. 146, captured and destroyed Carthage and had reduced Greece to a Roman province. The Ptolemies yet ruled in Egypt; and in Asia the Syrian Empire under the house of the *Seleucidæ* still survived, but was showing evident signs of decrepitude. In Asia Minor, Pontus was rising into importance under Mithridates V., who was one of the first of the more important sovereigns of the continent to enter into close relations with Rome. This position of affairs finally resulted in the great war between his son Mithridates VI. and Rome: which afforded that encroaching power the opportunity of firmly establishing the Roman rule in Asia; and eventually overturning the decadent power of Syria, already frittered away by internal dissensions between the members of the royal house of the *Selencidæ*.

To the east of Syria lay the powerful state of Parthia, which

founded by Arsaces I. about the year B.C. 250, had now B.C. 124 descended to the greatest of Parthian monarchs, Mithridates II. His father Artabanus had lost his life in an attack on the Tochâri, the Ta-hia of the Chinese narrative, who, having accomplished the destruction of the Greek kingdom of Bactria, were threatening the adjacent kingdom of Parthia. Mithridates continued the war and was eventually successful; taking possession of Sarangia, and forcing the Scythian tribes who had poured down on Bactria to find a vent for their superabundant energy in Afghanistan and the Punjaub.

To the north-west of Parthia lay Armenia, a country geographically of importance in the long continued disputes of West and East; and its peculiar relations with Pontus and Parthia led to the first contact of Rome with the latter power. Forced at last to take some side in the quarrel of Rome and Pontus, Mithridates II. of Parthia despatched an envoy to the Roman General Sylla; and thus by a curious concatenation of circumstances it fell to the lot of one man to open negotiations with the two great empires of the East and West, China and Rome.

The Chinese embassy preceeded, however, that sent to the Roman General by some thirteen years, and may probably be referred to the year 105 B.C. The power of Rome was already making itself felt in Asia, but the absence of any allusion to it in the pages of Sze-ma T'sien seems to prove that Parthia had as yet seen no cause to anticipate the struggle for empire which the events of the next few years forced upon her. For some years longer she succeeded in holding herself neutral in the great war between Rome and Mitridates of Pontus; but the great republic at last compelled her to declare herself, and we find the Parthians for a short period in alliance with Pompey,—an alliance however sufficiently unnatural to lead to a breach a few years later, and which finally culminated in the total defeat of the Roman army under Crassus.

The descriptions given in the following pages will serve to explain many of the allusions to Serica and the Seres in the pages of the Augustan poets, and enable us the more readily to comprehend how Parthia came to be the medium of communication. A misinterpretation of the embassy of Chang-K'ien has led to erroneous views on the intercourse of China and the west; and as the received version of the embassy, taken mainly at second hand from late Chinese writers, could scarcely be made to tally with what we knew of Asia from other sources, much needless doubt has been thrown on the accounts of the embassy extant.

I have in the following notes adhered to the original description given in Sze-ma T'sien's great work, the *Shi-ki*; and as Sze-ma was almost a contemporary of the events he describes his account is naturally more trustworthy than that of later writers, who simply copied his descriptions, or, if they varied generally did so erroneously.

Two writers from very different stand-points have given us geographical descriptions of Central Asia during the period referred to. In the East we have Sze-ma T'sien; in the West Strabo. The Chinese is somewhat the older in date; having been born B.C. 163, while Strabo's birth is attributed to about B.C. 66. As might be expected the Chinese author is fullest in his descriptions of Eastern Turkestan, while Strabo's recital ends with the lately overthrown Greek Kingdom of Bactria. The Chinese author was acquainted with Parthia, and even with Sarangia, the modern Seistan, while many of the other Central Asian States were known to him by report. Both writers were careful and critical, and hence have arisen many curious and undesigned coincidences, which enable us to gauge the general trustworthiness of both narratives. These coincidences I have remarked on in the notes attached to the text; which is a translation of the CXXIII. Chapter of the *Shi-ki* or "Historical Memoirs" a work which deservedly holds a high rank amongst histories; and the translation of which in full would add much to our knowledge of the early history of Eastern Asia.

I have preserved the ordinary transliteration of the Chinese names; not that that system is to be considered correct, but that it has for the present become so firmly fixed as to be more familiar to students. The rules for transliteration into the older language, which seems to have partially survived up to the Han dynasty, are stated Journal N. S. Vol. XII. p. 124.

THE INTERCOURSE OF CHINA WITH EASTERN  
TURKESTAN AND THE ADJACENT COUNTRIES  
IN THE SECOND CENTURY B.C.

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The following is mostly a translation from the 123rd Chapter of the Shi-ki or "Book of History" of Szema Ts'ien. Information divided from other sources is inserted in the form of Notes.

As a portion has already appeared in print (vid. *Celestial Empire*, May 6th, 1876) I shall only give a summary of the beginning.

Chang K'ien had been sent by the emperor Wu-ti of the Han dynasty to try and open communication with the Yueh-ti or (Viddals, the Ἐφθαλῖται of the Greeks) who, having been dispossessed by the Turks (Hiung-nû or Kara Nirus) had poured down on the decaying Greek Kingdom of Bactria, called by Szema Ts'ien Ta-hia 大夏 i.e. Tochâr-ia, from the Tochâri (Τόχαιοι of Strabo) who had lately overrun it, and whose name survives to the present day in Tokhâristan.

Chang-k'ien on his road outwards was captured by the Turks and held in captivity for ten years. Having made good his escape, and nothing daunted, he determined to carry out the object for which he had been sent. Travelling westwards for ten days he arrived at Ta-yuan 大宛, a country which forms the central feature in the narrative, and regarding which much misapprehension has existed. Ta-yuan has been usually identified with Ferghâna or Kokand, the valley watered by the upper streams of the Sir Daria and recently annexed by Russia, but the narrative will show that it must be placed east of the great Pamîr steppe, and most probably near the site of the modern Yarkand.

Chang K'ien tried to induce the people of Ta-yuan to enter into a league under the Chinese suzerainty, with the object of driving back the Turks, then encamped along the slopes of the T'ien-shan. In this although received with civility he was unsuccessful; and he went on to K'ang Ku 康居, apparently Riāng Kul on the Pamîr. Passing through K'ang Ku Chang K'ien came to the Yueh-ti, who dwelt then on the banks of the Tu-kwai Shui 都犏水 or Surkh-ab of to-day; their southern boundary being formed by the Kwai 犏 Shui (the Wakh or



Oxus). Though animated with a burning hatred towards the Turks, who had expelled them from their ancient seats in what is now Kan-suh, they could not be brought to agree to the proposition of the Chinese ambassador; who thereupon went on to the Tahia (Tochâri) with the object of returning to China through Thibet 羌. After a detention of more than a year he was a second time captured by the Turks; but taking advantage of the confusion caused by the death of the Shen-yu, he finally escaped back to China (B.C. 126) after an absence of thirteen years. He was honourably received and promoted to high office.

Szema T'sien then proceeds to a geographical description of the countries visited. Ta-yuan lay to the southwest of the Hiung-nü territory and about 10,000 *li* due west from China. The country was for the most part settled, and the land cultivated, producing both rice and wheat. The inhabitants made use of wine made from grapes 蒲陶,<sup>1</sup> and possessed many Shen<sup>2</sup> 善 horses. These were described as sweating blood; and being descended from a celestial breed 天馬子. There were some seventy cities large and small in the country, and its population was calculated at about 100,000. Its troops used the bow and spear, and shot from horse-back.

North-west of Ta-yuen lay K'ang-ku; west the greater Yueh-ti (Εφθαλίται); south-west Ta-hia (Τόχαροι); north-east the Wu-sun 烏孫 (Ἀσιανοί). To the east were Kan-mi 扞婁<sup>3</sup> or Kan-mao and Yu-t'ieu 于寘 (Khoten). West of this latter place the rivers flowed to the Western sea. East of it into the Im-châk (the Salt marsh, later on called the Salt Water 鹽水 i.e. Lake Lob<sup>4</sup>) which was said to have an underground communication with the sources of the Yellow River. Adjoining the Im-châk were the States of Low-lân 樓蘭 (apparently originally called Dardan<sup>5</sup>) and Ku-sze 師姑 (also called Kiu-sze or Ch'e-

1 P'u-tao-tze 蒲陶子 the grape, is apparently connected with the Greek βότρυς. Strabo XI, X., speaking of Margiana calls it 'ευάμπελος, and says of the grapes that they grow in bunches two cubits in size τὸν δὲ βότρυν δίπηκυν.

2 I have left *Shen* have translated, as in the sequel it will be found to bear a technical meaning.

3 扞 Han or Kan is probably in error for 扞 Yu; Ch. Recorder VII. and the characters, written also 扞 彌, represented apparently Khor-i-a, Kiria of the maps.

4 Lob is apparently a corruption of Lavâpa i.e., Salt Water.

5 See Chinese Recorder VII. 342.

sze 車師 *i.e.* Akshi<sup>6</sup>), the plains outside the cities of which reached to the waters of the lake.

Of Wu-sun we are told that it lay some 2,000 *li* to the north; its people were herdsmen, and similar in their customs to the Hiung-nû. They could produce some ten thousand bowmen, brave in fight. Formerly subject to the Hiung-nû they had attained independence. They married their near relations, and refused to pay homage at court.<sup>7</sup>

North-east of Ta-yuan lay K'ang-ku;<sup>8</sup> whose inhabitants were similar in their customs to the Yueh-ti, and which could produce some 80,000 or 90,000 bowmen. On its south lay the Yueh-ti, on the east the Hiung-nû.

Some two thousand *li* to the northwest of Kiang-ku lay Im-

6 In the Shui-king called 且末 C'he-möt *i.e.* Aksh-marda; by Yuen-chuang 折摩馱那 Che-mo-t'o-na, Aksmardana, which he identifies with 湟末 evidently an error for 湟末 Chek-möt, agreeing in sound with the name in the Shui-king.

7 The Wû-sun 烏孫 are apparently to be identified with the Asii or Asiani who according to Strabo occupied the upper waters of the Jaxartes, and who are classed as nomades with the Pasiani, To-châri and Sakarauli, the latter possibly transposed from Sarakauli, *i.e.* the Sarikoolies of Shaw. Strabo's description would agree perfectly with Sze-ma's both as to locality and manners.

8 K'ang-ku 康居 I am disposed to identify with the Rañgha of the 1st Fargard of the Vendidad, which Sir H. Rawlinson (notes to Monograph on the Oxus, Journal R. G. S. Vol. XLII. p.p. 494,501) places in the position I have marked out for K'ang-ku. Etymologically K'ang, in Cantonese hong, *repose, joy*, and Zend rañh, to *sound, praise*, seem to be connected with Sanscrit ras, 1st *gustare, amare*; 2nd *sonare, clamare*; Greek εἰρήνη, εἶρω. The old pronunciation therefore of the Chinese word would thus have approached nearer than the modern the Zend rañh; in which case the Chinese K'ang-ku would have represented sufficiently well the Rañgha of the Vendidad. The verse in which the name occurs has been translated so very differently by Spiegel and Haug that it may seem presumptuous to offer an opinion, but it may be rendered "As the sixteenth best of regions and countries, I, who am Ahuramazda produced Rañha upon the waters, governed without supreme chiefs." The phrase upon the waters may refer to its position surrounding the lakes of the Pamir; or taken in connexion with the next verse which speaks of the subsequent creation of frost and snow, to the legend of the upheaval of Pamir from the primeval waters, and the consequent increase in the severity of its winters as the land grew more elevated. This legend is given at greater length in the 2nd Fargard. The statement that it was governed without supreme rulers agrees with the description of the inhabitants as semi-nomades similar to the Yueh-ti. That they were not Turks we may gather from the text which always connects them with the Aryans of Yuan and Im-t'sai.

t'sai, called subsequently Im-t'sai-li-kan<sup>9</sup> (Samarkand) very similar in its customs to K'ang-ku, and which could muster upwards of 100,000 bowmen. It adjoined a great marsh<sup>10</sup> with-

9—Im-t'sai-li-kan 奄蔡黎軒. It seems most likely here that the two first characters are inverted and that we should read T'sai-im-li-kan in the old pronunciation Sal-im-ar-kand for Salmarkanda, modern Samarkand, the Marakanda of Strabo and Ptolemy.

10—The great marsh communicating with the Northern Sea is to be placed to the east of the present Aral. Strabo describes the Polytimétus or river of Sogdiana as flowing through cultivated grounds and ending like the Arius (the Herirud) in the desert. The name Polytimétus was not original, but was conferred by the Macedonians. Ptolemy speaks of several unnamed rivers flowing from the Sogdian mountains, one of which he says formed the Oxean marsh. Two others which rose in the mountainous region of the Kômédæ, where the Jaxartes itself had its rise, joined it in either side, one of which was the Dêmus, the other the Baskatis. Ammianus Marcellinus, while generally following Ptolemy, is more explicit. He tells us that two navigable rivers the Araxates and Dymas, which descend into the plain through gorges and precipitous valleys, form at the foot of the Sogdian mountains a long and wide marsh known as the "Oxia palus." Strabo too speaks of extensive marshes east of the Hyrkanian sea. A slight alteration in the level of the Aral and an increased flow of water in the upper Zarafshan would restore this condition of affairs. The upper valley of the Zarafshan is still called Macha, whence not improbably is derived Ptolemy's Baskatis, and the Demus in this case would be the present Kishka, which after flowing past Karshi loses itself in desert. There seem to be still remains of the ancient bed of the Jaxartes across Kizilkûm from Khojent along the northern flanks of the Sogdian mountains. When Alexander the Great was at Samarkand he determined to advance as far as the river Tanais, and on it at the furthest limit of his territory, found a city to be called Alexandria. On the Tanais was the city of Kyra called by Arrian Kyrupolis. In two days he captured the five intermediate cities, and on the third appeared before Kyra. He found the water in the river so low that a portion of the bank beyond the extremity of the wall was dry, and by this means introduced a portion of his troops into the city, who opened the gates for their comrades. After a severe fight, the garrison retired to the citadel which they defended a day longer, but were compelled for want of water to surrender. Strabo waxes wrath over the account of the Macedonian, whom he accuses of falsehood for calling the river the Tanais. As however, Dânu in Zend signifies river, it is not unlikely that the lower course of the Jaxartes may have been known by some such name to the Persians who accompanied Alexander. Kyra was destroyed, and on the site was erected Alexandria Eschatê. The present town and citadel of Jizakh probably occupy its site. The marsh described by Sze-ma would thus have stretched from the neighbourhood of Bokhara, across the Kyzil-kûm, and northeasterly in the direction of the present Otrar near the junction of the Arys with the present Syrdarya. This river is not improbably the Araxes of Strabo (XI., VIII., 6) which he says was the principal cause of the inundation of the land; it divided at its mouth into several branches, some of which flowed to the "other sea" towards the north, and one into the Hyrkanian gulf.

The statements of the old geographers, all point to the former con-



out defined banks, covered with reeds and (communicating with) the northern sea.

West of Ta-yuan at a distance of two or three thousand *li* lay the Yueh-ti who dwelt north of the Oxus 媼水. Their country was bounded in the south by the districts lately conquered by the Ta-hia (Tochâri), and on the west by An-sik 安息<sup>11</sup> or Parthia. The Yueh-ti were herdsmen and nomades, and in manners and customs resembled the Hiung-nû. They could muster some 100,000, or 200,000 bowmen. After their defeat at the hands of the Hiung-nû they had removed to a distance; and passing Ta-yuan had attacked the Tahia from the west and defeated them. The Yueh-ti followed the course of the Tu-kwai (Surkh-ab) and fixed their royal residence on its northern bank. A portion of the tribe not being able to get away with the others took refuge in the Nan-shan amongst the Thibetans 羌, and became known as the lesser Yueh-ti.

About 1,000 *li* to the west of Ta-hia, lay Parthia, a very powerful state about 1,000 *li* square, and which had dependant on it about one hundred cities large and small. It was well cultivated, and had marts where the people and merchants trafficked. Both carriages and ships were used for the conveyance of merchandise, and it had a silver coinage bearing the image of the king, changed with each successive reign.

To its west was T'iaou-chi<sup>12</sup> 條枝 (Sarangia or Drangia); to its north Im-t'sai-li-kan (Samarkand).

T'iaou-chi was on the sea coast. It was an agricultural coun-

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nection of the Aral and Caspian. Pliny says that an expedition sent by Pompey travelled in seven days from India to the river Icarus, the river of Balkh, which then flowed into the Oxus; and that thence Indian merchandise could be conveyed by way of the Caspian to the Kyrus, from which a portage of not more than five days was sufficient for their carriage to the Phasis. Strabo makes on the authority of Aristobulus the same statement, which however must be received *cum grano salis*. In this case either the levels taken by the Russian engineers must be erroneous, or the basin of the Aral has undergone an elevation of at least two hundred feet, as the Russian surveys place the dividing ridge between the two seas at that height above the water-shed of the Manych between the Caspian and Black seas.

11 安息 Ngan-sik. The old pronunciation of 安 seems to have been ar., cfr. Gr. ἄρεμος; Sans, ram. Parthia was apparently known to the Chinese as Arsak after the title of its kings.

12 條枝 T'iaou-chi. T'iaou is to be compared with Gr. σείρα showing that the initial was s.



try, producing rice. There were large birds<sup>13</sup> there, with eggs as big as water jars. It was inhabited by a turbulent people, who were continually changing their sovereigns, and hence fell an easy prey to Parthia. Old men in the latter country said that in Sarangia was the Yok-shui and the Si-wang-mu,<sup>14</sup> but they had not seen them.

Ta-hia (Tokharia) was situated about two thousand *li* southwest of Ta-yuan, to the south of the Kwai-shui (Oxus). It was a settled country with towns and villages; the people very similar to those of Ta-yuan. There was no supreme ruler, each city and town electing its own chief. Its soldiers were weak and cowards in battle, fit only for traders. The Yueh-ti attacked it from the west, defeated its forces and established their superiority. Its population was reckoned at upwards of a million; its capital was Lam-shi-c'heng<sup>15</sup> (Darapsa of Strabo). It has marts for the sale and purchase of merchandise. To its southeast lay Shen-tu 身毒國 (India).

When Chang-kien was in Ta-hia he noticed some goods which had come from Szechuen 蜀, and asking how they had come, he learnt that they had come by way of India.

Of India we learn that it was situated some thousand *li* to the southeast of Ta-hia. The country was cultivated, and the manners and customs of its inhabitants were very similar to those of the Tochâri. The climate was damp and hot, and the people made use of elephants in war. It lay near a great river (the

13 Ostriches, whose former range seems to have extended to these regions.

14 The Yok-shui, 弱水 weak, or rather dead-water, is evidently here applied to the Hamun or lake of Seistan. The Yok-shui of Chinese legend referred apparently to an ancient lake once occupying the greater part of Eastern Turkestan, and of which lakes Lob and Gash are the decaying representatives. It is associated with the Kwen-lun shan i.e. Mts. of Gandhara and the Si-wang-mu 西王母. The latter name seems to be a corruption of Sumeru, the character 王 being used for 亡, in Cantonese mong, and connected with the root mar or mor to die. W. F. Meyers in his Chinese Readers' Manual *sub. voc.* gives a sketch of the wonderful legends which have grown up round these two names. They are evidently connected with the Hindoo stories of the Gandharvas. Finding as their knowledge of Eastern Turkestan extended that they could not apply the legends to Lake Lob in its then condition, and hearing of the similar situation of the Hamen, the stories were readily transferred to the new site.

15 Lam-shi Ch'eng 藍市城 the Da-rapsa, Δάραψα of Strabo. The phonetic as seen in 驢 lam i.e. λαμβάνω seems to point to an original lamb. Darampsā was probably the original form of the name.

Indus). Chang-k'ien calculated the distance from Ta-hia to China at twelve thousand *li*. It was situated to the southwest of the latter country.

India lay upwards of a thousand *li* to the south of Tahia. There were commercial relations between Szechuen and India, the two countries not being very distant from one another. At present intercourse with Ta-hia is carried with difficulty through Thibet 羌; the Thibetans not being friendly. Some few on the north, on account of what they can gain from the Hiung-nâ, prefer the shorter road by Szechuen, which is besides free from robbers.

The emperor heard that Ta-yuan had entered into relations with To-châria and Parthia, all being important countries with large commerce, well settled land, and arts yielding only to the Chinese. Their military power was but small, and they valued highly the productions and wares of China. To their north lay the Yueh-ti and K'ang-ku fierce in war. They might be induced by the hope of profit to enter into relations with China. This was as reasonable a connexion as could be hoped for, since the countries extended some ten thousand *li*, and nine interpreters were needed to reach the different tribes, their authority extending as far as the Western Sea (the Arabian Gulf).

The emperor was much pleased and gave his assent to what Chang-k'ien had suggested, and directed him to despatch from Kien-wei 犍爲<sup>16</sup> in Szechuen expeditions along the four roads leading outwards from that place, viz., by Mang 駙, by Yen 冉, by T'u 徒 and by Kiung-pak 邛 樊. Each advanced one or two thousand *li*. That taking the northern road was stopped by the Tai-tsok 氏 笮, that going south by the Kwen-ming 昆明 of Sui 嵩.<sup>17</sup> The Kwen-ming tribes acknowledge no supreme ruler. They were a set of robbers, and seized and killed the Chinese travellers, so that this route had to be given up. They however heard that some thousand *li* or so to their west lay a country where elephant carriages were used named T'in-yût,<sup>18</sup> the people of which carried on a clandestine trade with Szechuen.

As the Chinese were now seeking to establish a route to To-châria, they commenced by endeavouring to communicate with

16 Kien-wei, now Kia-ting-fu.

17 Sui, now Li-kiang-fu in Yunnan.

18 T'in-yût 滇 越 apparently the ancient Stbâneswara now Oude and Rohilkund (See Cunningham's Ancient Geog. of India I. 328) but here applied to north-eastern India generally.

T'in-yât. They first tried to open a road to the southwestern I 夷 and spent much money on it. They did not however succeed, and discontinued it. Chang-k'ien affirmed that it was possible by this route to reach Tocharia, and a second time tried negotiation with the I. He was however appointed to join the commander-in-chief in an attack on the Hiung-nû, as he was well acquainted with the localities where water and provisions were to be found, so that the army should not suffer from their want. He was also invested as marquis of Po-wang. This was in the sixth year of the term Yuen-so (B.C. 128).

The next year he was appointed escort officer 衛尉, and ordered in conjunction with General Li, to lead the right wing in an attack on the Hiung-nû. The Hiung-nû surrounded General Li, whose forces suffered severe loss: Chang-k'ien came, however, to his aid and succeeded in rescuing many of his troops.

This was the year in which the Chinese despatched the Light-horse General (Ho Kü-ping) with ten thousand troops to attack the western settlements of the Hiung-nû. He succeeded in advancing as far as the K'i-lien Shan.<sup>19</sup>

The next year the King of Hwan-ya 渾邪 induced his people to submit to the Chinese, and in consequence Kam-ch'eng 金城 Ho-si 河西, Si-ping 西拉 and Nan-shan 南山 as far as the Im-chak (Lake Lob) were cleared of the Hiung-nû,<sup>20</sup> and for the time their chiefs ceased their encroachments. Two years after this the Chinese routed I 悉 Shen-yu to the north of the Gobi.

After this the Emperor bethought himself of asking Chang-k'ien as to the condition of Tayuan. Chang-k'ien had been deprived of his marquisate (on account of the defeat mentioned above<sup>21</sup>). He replied "When your servant lived amongst the Hiung-nû he heard that the King of the Wu-sun was called K'wen-mo 昆莫. His father had ruled over a small state lying immediately to the west of the Hiung-nû, which was attacked by the latter, who killed K'wen-mo's father (his name according to the Han-shu was Nan-tow-mi 難兜靡) K'wen-mo was deserted

19 祁連山 K'i-lien is said by the Chinese commentator to have been the Hiung-nû title for heaven. If this is correct the characters are inverted and should read 連祁 i.e., Dhan-gri. The How-Han-shu gives Chang-li i.e., Tangri as the equivalent, vide A. Wylie, *Journal of the Anthropological Ins.* Vol. II. No. III.

20 These positions, were in the prefectures of Lan-chow and Si-ning in the present Kansuh. For a detailed account of these operation vide Shi-ki Ch. 110 also A. Wylie *l.s.c.*

21 A. Wylie *l.c.*



in the wilderness. The ravens brought him meat in their mouths and hovered over him, and a wolf came and gave him suck.<sup>22</sup> The Shen-yu astonished at the prodigy took him and brought him up, and when he grew up to manhood gave him a body of troops to command.

Finding he was a man of ability, the Shen-yu restored to him his father's people, and gave him the protection of the western cities. K'wen-mo carefully looked after the interests of his people. He raised a corps of ten thousand bowmen, and accustomed them to battle. The Shen-yu dying, K'wen-mo led his people to more distant quarters, and established himself as an independent prince, as he did not wish to continue subject to the Hiung-nû. The Hiung-nû thereupon sent a force to attack him, but were unsuccessful, on account of the supernatural protection afforded him, as well as the distance. Without any important fight they entered into a compact with him. At the same time the Shen-yu was much distressed at the progress of the Chinese.

The territory of Hwan-ya had been almost depopulated, and the barbarian tribes 蠻夷 were willing to accept presents from the Chinese, and the present was a favourable time for holding out inducements to the Wu-sun. They might incite them therefore to move eastward and take up their abode in the former territory of Hwan-ya, where they and the Chinese would be as brothers. If they accepted the invitation, it would be equivalent to cutting off the right arm of the Hiung-nû. The Wu-sun placed in close contact with China, and a connexion formed through them with Tocharia in the west, all might then become outer tributary states to the empire.

22 This tale of suckling by a wolf, familiar in the cases of Romulus and Cyrus, is matched by at least two more tales from Chinese sources. In the Tso-chuen VII. V. is given the story of Tsze-wan of T'sû suckled by a tiger Ch. Class. V. 297. Klaproth *Tableau de l'Asie* relates from Chinese sources, the similar story of Assena, founder of the northern Turks, p. 114. The addition of the raven (烏 wu) above is a play on the name of the tribe (Wu-sun). With regard to the attack on the Wu-sun, Mr. Wylie's translation (*l.c.*) may be quoted. In the year 176 B.C. the Shen-yu wrote to the Emperor \* \* \* "Now in consequence of a slight breach of the treaty by some petty officials you pursued the Right Sage Prince, till he was driven westward into the territories of the Yueh-ti. There, however, Heaven favoured our cause; our officers and troops were loyal and true; our horses strong and spirited; and by slaughter, decapitation, subjugation and pacification our army effected the complete reduction of the Yueh-ti; while Low-lan, Wu-sun, Hu-ki and the adjacent kingdoms, to the number of twenty-six in all, without exception submitted to the Hiung-nû; and thus all the bowmen natives are united as one family.



The Emperor gave his assent to the scheme and appointed Chang-k'ien leader with the rank of Chung-lang 中郎. He took three hundred men, each provided with two horses. The mission was supplied with about ten thousand sheep and oxen, and gold and silk for presents in almost unlimited quantities. Everything was done to expedite it; along the road it has to traverse presents were sent to the neighbouring districts.

On his arrival amongst the Wu-sun, Chang-k'ien was received with ceremonies similar to those made use of by the Shen-yu. He was much mortified at this. Knowing, however, the avarice of the barbarians, he told them that he was the bearer of gifts from the Emperor. If the king were not willing to acknowledge the Emperor as his superior lord, then he would take them back with him. If he agreed to acknowledge him then he would present them; they might take their choice. Chang-k'ien then explained the object of his visit. The people of Wu-sun had the opportunity of moving eastward and occupying the territory of Hwan-ya; in case they did so, the emperor would bestow a princess of his own immediate family on the king. The people of Wu-sun (it was urged in reply) would be divided; their King was old, and they dwelt so far from China that they did not know whether it was a large or small state. They were long accustomed to the ways of the Hiung-nû; they were their neighbours, and their leaders feared the power of the Hu. They did not desire to change their quarters, nor had their King power to compel them. Chang-k'ien could not prevail them to accept his propositions.

K'wen-mo had some ten sons; the second of whom was called Ta-luk 大祿: he was brave and skilled in leading troops. He moved his quarters with about ten thousand horsemen. Ta-luk's eldest brother was Tai-tsze and had a son named Sham-t'su. This brother died young. As his death approached he expressed to his father his desire that Sham-t'su should become Tai-tsze in order to preserve the succession. K'wen-mo willingly assented, and after his death Sham-t'su 岑娶 became Tai-tsze. Ta-luk was irritated that he had not been appointed; he plotted with his younger brothers, and raised a rebellion with the object of compelling his father to set aside Sham-t'su, K'wen-mo was now old, he was apprehensive that Ta-luk would kill his nephew, and sent away the latter to new quarters with ten thousand horsemen. K'wen-mo had still ten thousand horsemen left which he kept about his own person. The forces of the state were thus divided into three bodies, of which those adhering to K'wen-

mo were, however, the most powerful; but K'wen-mo under the circumstances did not dare to enter alone into a compact with Chang-K'ien

Chang-k'ien in consequence divided his embassy, and sent his lieutenants to Ta-yuan, K'ang-ku, the greater Yueh-ti, Ta-hia, An-sik, Shen-tuh, Yu-t'ien, Yu-mui and the contiguous countries, Wu-sun supplying escorts and interpreters.

When Chang-k'ien returned he arranged with Wu-sun that they should send ten envoys, with ten horses, to return thanks (for the proposals that had been made) and that they should be able to see the extent and power of China. On Chang-k'ien's arrival he was promoted to the dignity of *ta-hing* and made one of the nine grandees, but died the following year.

The Wu-sun envoys having seen China, its great population, its wealth and liberality, returned to their own country and reported how great in comparison was China. For many years after Chang-k'ien's mission, intercourse with Ta-hia continued and men passed freely. It was thus that communications commenced between China and the countries to the north-west, the way to which had been opened by Chang-k'ien. All succeeding envoys spoke of the honesty and straight-forwardness of his dealings with foreign states, and the latter agreed in their appreciation of his character.

After the death of the Marquis of Po-wang (Chang-k'ien) the Hiung-nû, hearing of the arrangements between China and the Wu-sun, were irritated, and wished to make an attack on the latter; the Chinese, they said, had opened communication with the Wu-sun, and there were nothing to prevent them going southward and forming a league with Ta-hia and the greater Yueh-ti. The Wu-sun were alarmed; they sent envoys to China with a present of horses, and asked a Chinese princess in marriage, so that they and the Chinese should be brothers. The Emperor laid the request before his Ministers in Council. They all said, "let them first send the wedding presents, afterwards we will send the bride." The Emperor wrote a letter in reply "Shen horses come from the north-west; those to be obtained in Wu-sun are good, notably those known as T'ien horses. There are also Han-hiueh (blood-sweating) horses of Ta-yuan full of spirit. Besides there are the celebrated Wu-sun horses called Western Paragons 西極, and the noted horses of Ta-yuan called the T'ien horses etc. When China first desired to establish settlements in the West, it founded the principality 郡 of Tsiu-t'siuen to facilitate intercourse with the North-west. Since China is now sending missions to

Parthia, Samarkand, Sarangia, and India, and the Emperor is desirous of having a supply of Yuan horses he sends this letter in the hopes that his wishes will be attended to."<sup>23</sup>

As to the Envoys sent by China to foreign countries one *pei* complete consisted of one hundred. Few however, numbered as many. Those who had been trained under the Marquis of Po-wang and afterwards had increased experience, had dwindled to a few. The Chinese despatched yearly missions, of which the larger consisted of ten or more *pei*; the smaller of five or six. Those to the more distant countries were absent eight or nine years, to the nearer, a year or so.

It was about this time that China effected the conquest of Yueh, and made an impression on the south-western I in Sze-chuen 蜀, so that these requested permission to send envoys to do homage to the Emperor. At the same time the departments were formed of Yik-chow 益州, Yût-sui 越雋, Yang-ho 羊何, Sham-lai 沈黎, and Wan-shan 汶山.<sup>24</sup> The desire being to amalgamate with the Empire all the countries between it and Tochâria.

The same year Peh-shi-ch'ang, 栢始昌, a man of Lu-yût 呂越, was sent with ten companies through the newly appointed departments to proceed to Tochâria. They were stopped by the K'wen-ming,<sup>25</sup> who murdered the escort and plundered the presents, and put an end to the expedition. In consequence of this outrage the Chinese raised three battalions from amongst the criminals of the Empire, and about ten thousand troops of Sz-chuen 巴蜀 soldiery, and sent them under the command of the two generals Kwoh-ch'ang and Wei-kwang-tang to punish the K'wen-ming for the outrage on the mission. They executed or imprisoned about ten thousand individuals, and an expedition was again despatched. The K'wen-ming again plundered it, so that eventually attempts at intercourse were given up, and all communications with Tochâria passed along the northern route by way of Tsiu-t'siuen.<sup>26</sup>

As the number of expeditions increased, a distaste for the

23. The whole of this passage is written in a peculiar style. The text is probably corrupt.

24 Near the present Ch'eng-tu-foo in Sze-chuen.

25 See above p. 10.

26 Tsze-lung says (in his account of the intercourse of the Hans with the western States. "The southern route led through Sze-chuen 蜀, the northern by way of Kam-ch'eng 金城 and Tsiu-t'siuen 酒泉. The southern route not being open, they made use of the northern, which they were enabled to do owing to the retreat of the Hiung-nû. The southern route was rougher, and altogether more difficult to travel than the other.



Chinese commodities arose amongst the outer states, and their goods were not valued. When the Marquis of Po-wang opened up the road to the outer world they were highly esteemed. Succeedings missions, however, were hasty and got insolved in disputes. The Emperor published a notification stating that foreign countries were strange, and dangerous to be traversed, he therefore invited volunteers. Should none be found willing to serve he would have to give up the more distant expeditions. This words were heard with indifference and the people did not respond to his invitation for officers. He made ample provisions for numbers of men, in order to expedite them along the road but they returned; not being able to prevent robbery and plunder of the goods, and the missions proved an utter failure. The Emperor still persevered; he enquired judicially into the heavier offences, and insisted on restitution.

When he again sought for envoys he did his best to select good men, not poor, nor given to breaking the laws, but the officials suddenly recommenced to shrink having anything to say to foreign affairs. They said that the majority looked upon them with indifference, and but few favoured these expeditions. Idle reports without foundation were circulated, and much unpleasantness ensued. The envoys sent were all the sons of poor men; the officials provided private stores of goods, and with a view to private pelf procured them of the thrashest description. The foreigners in consequence grew suspicious of the Chinese caravans, the more especially, as the words of the leaders could not be depended on. Thinking that the Chinese forces were at too great a distance ever to get at them, they stopped supplies of food and goods in order to distress the expeditions. The caravans were well nigh starved, and ill-feeling ran so high that blows were exchanged.

Low-lan and Ku-shi were but small states and the road lay through their territories; they attacked and plundered the envoy of Wang-k'uei and his escort. The Hiung-nû at the time were very hostile and thought an opportunity had arrived for striking a blow at these missions to the west. They sent envoys all round to remonstrate at the danger to foreign interests; on all sides were cities and forts, and their soldiers though not strong might strike a blow. The Emperor thereupon sent the Marquis of Piao and the P'o-nû General with the cavalry of the allied states and about 10,000 infantry. They in due course arrived at the Hiung river, and determined to attack the enemy, but the latter had retired.



The next year he attacked Ku-shi; and P'o-nû with seven hundred of his light cavalry having arrived first, he captured the King of Low-lan. Having reduced Ku-shi to terms he disposed his troops so as to overawe Wu-sun and Ta-yuan, and returned, when P'o-nû was made Marquis of Chuk-ye (B.C. 108).

Wang-k'wei was frequently employed as an envoy, and what he did with reference to the difficulty at Low-lan was reported to the Emperor. The Emperor accordingly having raised an army placed Wang-k'wei in command with orders to assist P'o-nû, and invested him as Marquis of Ho. At this time Tsui-t'siuen was separated from Ting-chang as far as Yuh-men.

Wu-sun having sent a thousand horses as a betrothal gift, the Emperor sent Kiang-tu, a princess of the Imperial house, as a bride to Wu-sun. K'wen-mo, King of Wu-sun made her right Foo-jen. The Hiung-nû having also sent a lady to marry K'wen-mo he made her left Foo-jen. K'wen-mo being old, he ordered his grandson Sham-t'su to marry the princesses.

Wu-sun was rich in horses; rich man had as many as four or five thousand. When the first Chinese envoy arrived in Parthia the King<sup>27</sup> despatched a general with twenty thousand horses to meet him on the western frontier, from which to the capital was about a thousand *li*. On the way they passed some ten cities. The inhabitants were all of the same race and very numerous. On the return of the mission he sent envoys with it that they might see the extent and power of China. He sent with them as presents to the Emperor eggs of the great bird of the country, and a curiously deformed man from Samarkand.<sup>28</sup>

Adjoining Wan on the west were the small states of Hwan-

27 Apparently Mithridates II. who ascended the throne *cir* B.C. 124.

28 Such gifts were evidently customary in these countries. When Pandion (King of the Indo-Scythians?) who, a little later reigned over the north-west of India, sent an Embassy to Augustus at Samos, the mission brought as presents a partridge larger than a vulture *περδικὰ τε μείζω γυνό;*, and a *hermes*, a man without arms who shot from a bow with his feet, as well as tigers, snakes and a large river tortoise: see Strabo *lib.* XV. The bird was apparently one of the *struthionidæ*; the descriptions point to the ostrich, but the ostrich was well known to the Romans, who ought certainly to have known better than to call it a partridge. There is no physical difficulty involved in the supposition that the range of the ostrich formerly extended across the Persian gulf to the deserts of Kermania and Sarangia. Its eastern limit would thus coincide with that of the lion. It is possible of course that a second species of *struthio*, now extinct, inhabited these districts at the time in question, and that it was sufficiently distinct to justify the description of Strabo.

t'sim 驩潛<sup>29</sup> and Ta-yik 大益. To the east of Wan were Ku-shi, Yu-mi and Su-hiai 蘇薤. All complied with the desires of the Chinese envoys, and sent tribute to the Emperor. The Emperor was much pleased and took the opportunity of sending an expedition to explore the sources of the Ho, (Yellow River). The Ho rises in Khoten; the mountains about its sources produce large quantities of jade. The Emperor examined the ancient charts and books, and learnt that the name of the mountain in which the Ho has its rise is the K'wen-lun 崑崙 (i.e. Mts. of Gandhâra, see note to p. 9).

About this time the Emperor was in the habit of making pleasure excursions by sea, when he was accompanied by all the foreign visitors at court, and great numbers of people took part in them. Gifts and largesses were bestowed on them and a liberal store of provision, so that they might see how rich and liberal was China. There were every means of enjoyment afforded, plays and sleight of hand tricks; numbers collected to see them, and those who took part in them were well repaid. Wine was there in lakes; flesh as if forests. The Emperor gave orders to show the foreign visitors over the granaries and treasuries, where all manner of things were piled up, so that they might have some idea of the great resources of the empire. They were especially struck at the mechanism by which the plays and other representations were produced, and their astonishment was kept continually on the stretch.

At this time caravans regularly passed and repassed between China and the countries lying to the north-west, and even from places far to the west of Yuan, from Kiao-t'sze 驕忒 and An-jen 晏然,<sup>30</sup> but they had not yet established binding rules with respect to the treatment of envoys. From Wu-sun westwards as

29 Hwan-t'sim is Kharism; the Zend Quairizem; Gr. *Χωράσμα*. Ta-yik the *Δέρβικες* of Strabo, *Δροπικοί* of Herodotus.

30 晏然 An-yan. As in the similar case of Parthia we must pronounce the initial syllable *Ar*; the Aria or Arian-a of Strabo and Herodotus, the Haraéva of the Avesta. It lay S.W. of Bactria, and its name survives in the Herat of to-day. Strabo says of it that it is "partly composed of valleys enclosed by mountains, and partly of inhabited plains. The plains are watered by the Rivers Arius (Heri Rud) and by the Margus (Murgab) . . . Its length is about 2,000 stadia, and the breadth of the plain 300 stadia" XI., X. Kiao-t'sze is probably the Arachôsia of Strabo situated in the banks of the Arachotus, the Haraqaiti of the Avesta, the 訶羅跋 跋 I-lo-k'i-ti of the Shui-king.

far as Parthia they complied with the practice of the Hiung-nû.

When the Hiung-nû had conquered the Yueh-ti they had sent envoys hearing a letter from the Shen-yu; the neighbouring countries had passed them on, and had supplied them with provisions, not daring to detain or incommode them. On the arrival of the Chinese caravans, unless they were prepared with presents, and rich stuffs they could not obtain food, nor could they purchase beasts of burden or horses. These people concluded that as China was a long way off, and was rich, they could compel the caravans to purchase what they needed at any price they wished. They moreover feared the Hiung-nû more than they did the Chinese envoys.

In all parts of Wan and adjacent countries the people used grape wine. Rich men stored as much as ten thousand shih in their cellars. They did not value it till it was at least ten years old; they relished their wines and their horses relished lucerne 苜蓿. The envoys having brought home specimens of both the Emperor introduced the culture of the wine and lucerne in the fertile districts of the Empire.<sup>31</sup>

T'ien horses were now abundant. Foreign nations sent them in numbers, and they were distributed amongst the royal residences. The cultivation of grapes and lucerne succeeded to their best hopes.

From Ta-yuan westerly as far as Parthia although the languages spoken differed slightly, they yet had a general resemblance (大同俗) and were mutually intelligible. The men had all deep blue eyes (深眼) and large beards and whiskers. They were astute traders and would wrangle over a farthing. They held their women in high estimation, and the husband commonly took his wife's advice before coming to a decision. Their country pro-

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31 The Chinese name for the grape 葡萄, or as it is here written 蒲陶 p'u-tao is not native. As the grape itself was introduced from the neighbourhood of Yarkand we have to look to that locality for the origin of the name. Strabo speaks in many places of the exuberant growth of the grape in Central Asia. The wines of Asia he said might be kept for three generations in unpitched vessels *εἰς τριγόνιον παραμένει ἐν ἀπιώτοις ἀγγεσι*. So in his account of Margiana he speaks of bunches of grapes two cubits in size. It seems not unlikely that in the Chinese word therefore, which regularly represents the Greek *βότρυς* (see note p. 5.) we have a vestige of the Greek occupation of Bactria. It is possible too that the 苜蓿 Muh-suk of the Chinese may have some connection with the *μηδικὴ βοτάνη* of Strabo XI., XII.



duced every thing except silk and varnish 漆.<sup>32</sup> They did not understand the art of casting cash 錢 or metal vessels (some copies for 錢 read 鐵 i.e. they did not understand the art of casting iron vessels, a more probable supposition, as Sze-ma previously, see p. 6, speaks of the Parthians using silver coins.) They induced some of the attendants attached to the Chinese mission to desert for the purpose of teaching them the art of casting weapons and vessels. They obtained from China gold and silver for the purpose of making various utensils. They made little use of gems, and when the envoys were going away they took a quantity with them: of these a few were ordinary but the greater part were fit for imperial presents.

It was reported that there were concealed in Urh-shi 貳師城 a number of *shen* horses, which the people were not willing to hand over to the Chinese envoys. The Emperor wished much to have a stock of Yuan horses and was pleased at the information. He sent officers skilled in the management of carriages, with a thousand pieces of gold and a golden horse to ask of the King of Yuan the *shen* horses at Urh-shi.<sup>33</sup>

Yuan had had enough of Chinese commodities and readily entered into a plot. China, they said is far distant, and between us lies the salt lake (Lob) subject to sudden disturbances. Should they go to the north they will encounter the Hu (Turkish) robbers; if to the south there is a dearth of water and fodder. Whichever road they take there is an absence of towns, and scarcity of provisions. The Chinese envoys travel in companies of a hundred men or so: if they try to cross without provisions

32 A curious coincidence with Strabo's description of Bactria XL, XL. πολλή δ' ἐστὶ καὶ πᾶμφορος, πλὴν ἐλαίου. "It is an extensive country, producing everything except oil."

33 Urh-shi-ch'eng the capital of Ta-yuan has not been identified; it was probably not far from the site of the modern Yarkand. On page 23, *infra*, we are told that the Royal city of Yuan had no wells within the walls, and was altogether dependent on streams without the city for its supply of water." This perfectly tallies with the description of Yarkand given by Hayward, (Journal of R. G. S. XL. 84.) "Both the city and fort are supplied with water from several tanks, into which it is conveyed by canals cut from the river. These are frozen in the winter, and the supply is then stopped, but the tanks contain sufficient water for the consumption of the inhabitants until the regular supply is renewed in the spring." Urh-shi 貳師 was apparently pronounced Ur-dû, a corruption of Sanscrit Urdhva *high*. Its employment here as to the name of the chief city and citadel of Yuan was probably the origin of the modern Turkish use of the word to signify a citadel or royal city, and finally a camp.



they will die before they are half over. It would be easy to stop a large army without any effort on our part. As for the Urh-shi horses the people of Yuan value them and do not wish to hand them over to the Chinese envoys. The envoys were annoyed at their opprobrious words; they broke up the golden horse and took their departure.

The chief men of the city were vexed at their departure, and bethought themselves, the Chinese envoys will think but little of us, now that we have let them go; let us suggest to our eastern neighbours in Yuk-ch'eng 郁成 to intercept and murder them, and plunder their goods.

The Emperor was greatly enraged at hearing this, and consulted privately respecting the mission with Yao Ting-han. The latter told him that the military sources of Yuan were weak, and that though the Chinese troops did not exceed three thousand men, still they were brave and well trained in the use of the bow, and could at any time capture and destroy Yuan. The Emperor had himself had experience of his troops when he despatched the Marquis of Chuk-ye to Lowlan, the result of which was the capture of the King by the seven hundred cavalry before-mentioned. The Emperor expressed his assent to Ting's suggestion, and as he had a fancy for the Marquis on account of his favourite concubine the Lady Li, he appointed Li Kwang-li 李廣利 to command the force against Urh-shi. Six thousand cavalry were despatched from the dependent states, and in the provinces they enlisted about ten thousand youths for the expedition against Yuan. Li was given a fixed period to proceed to Urh-shi and capture the *shen* horses, and in consequence got the name of the Urh-shi General.

Li lost no time in making his forces effective, and for that purpose selected the Marquis of Ho and Wang-K'wei to guide the army, and Li-ch'i his Lieutenant to look after the affairs of the force. This was in the first year of the term of T'ai-ch'o (87th year of Wu-ti, B.C. 104.) At the same time there was a great plague of locusts in Kwan-tung, their ravages extending westward as far as Tun-hwang.

The Urh-shi General advanced with his troops to the west of Lake Lob: as he went along the road the small states were suspicious and closed the gates of their cities, nor would they supply him with provisions. He was placed in a dilemma. An attack on them would delay his advance. It was necessary to move, otherwise in a few days his stores would be exhausted.

Under the circumstances he turned North to Yuk-ch'eng.<sup>34</sup> The soldiers who were with him scarcely exceeded a thousand men, all exhausted by hunger. They attacked Yuk-ch'eng, but met with a severe defeat, losing in killed and wounded the greater portion of the force.

The Urh-shi general consulted with Li-ch'i and Chao Shi-cheng respecting the condition of affairs. They had got as far as Yuk-ch'eng, but could not take it; still worse would be their condition if they went onto the royal city (Urh-shi.) They determined accordingly to retire to Tun-hwang. The expedition had occupied three years, and on its arrival at the frontier not more than one or two tenths of those who had set out remained.

The General sent a despatch to the Emperor stating that the distance to be traversed was great, and they had suffered much much from hunger. The soldiers had died of hunger not in battle, and were too few in number to reach Yuan. As for the troops they were much exhausted: still if a larger force were raised they were willing to start again.

On hearing this the Emperor was much enraged and sent a messenger to intercept the army at Yuh-men, and enquire how it was that the army had dared to re-enter China without permission. Fearing the consequences the Urh-shi General detained his troops at Tun-hwang.

In the summer of the same year the Chinese lost some twenty thousand men of Tsok-yi's army at the hands of the Hiung-nû.<sup>35</sup> The chief officers of the state were unanimous in wishing to give up the war against Yuan and concentrating their forces in an attack on the Turks. The Emperor was however, determined in punishing Yuan. Yuan, he represented, was but a small country, if they failed to reduce it the Tochâri would think but lightly of China, and the supply of *shen* horses cease. Wu-san and Lun-t'ow would find it easy

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34 Yuk-cheng 郁成. The position is doubtful. It lay north of the road to Urh-shi. The first syllable probably represents the Turkish Ak.

35 B.C. 103. The Marquis of Tsok-yi had left Suh-fang in the spring of the year with 20,000 cavalry. The left Commandant General of the Turks had offered to transfer his allegiance in China, and the Marquis set out to join his forces. The plot had been discovered before his arrival and the commandant been put to death. The Turks fell on the Chinese but were defeated. The latter however retired, but before their arrival at the frontier were set on by the Turks, their leader killed and his army cut to pieces. Wylie in *T of Antropological J. l.c.*

to annoy the Chinese caravans, and they would become the laughing stock of foreign nations.

It was resolved to punish Yuan at any cost; prisoners in jail and ruffians of every description were impressed, and the younger culprits were sent to join the border cavalry. In little more than a year there marched out of Tun-hwang a force of sixty thousand men, not including army followers, accompanied by one hundred thousand cattle and upwards of thirty thousand horses, besides some ten thousand mules, asses and camels, all well supplied with fodder. The troops were well provided with cross bows, and the whole empire was moved to provide means for the attack in Yuan. More than fifty generals were appointed to the force.

The royal city of Yuan had no wells within the walls, and was altogether dependent on streams outside the city for its supply of water. The Chinese took with them men skilled in waterworks to divert the streams and so deprive the inhabitants of water. In addition to these preparations 180,000 men were sent to the north of Tsiu-t'siuen and Chang-yih and depots of provisions were established for the protection of Tsiu-t'siuen. From China they despatched the seven classes of criminals to act as provision carriers to the Urh-shi's army; men used to the management of vehicles were sent to join it at Tun-hwang, and two cavalry officers well skilled in the management of horses were attached as instructors in horsemanship, to take back the *shen* horses after the capture of Yuan.

When all was ready the Urh-shi General again set out with a numerous army. As they marched through the border states they were everywhere well received. On their arrival at Lün-t'ow,<sup>36</sup> however, the people would not submit; the army attacked the place, and in a few days destroyed it. From thence westwards as far as the chief town of Yuan the road was level.

On its arrival at Yuan, the Chinese force numbered thirty thousand men: the Yuan troops marched out to attack it, but were defeated and forced to retire within the city for shelter. The Urh-shi's troops had wished to go and attack Yuk-ch'eng;

<sup>36</sup> We are as yet too ignorant of geography of Eastern Turkestan to be able to fix position of Lün-t'ow. It lay west of lake Lob, and the indication that thence to Ta-wan the road was level would seem to place it at the W. extremity of the mountains known to lie S.W. of the lake. Lun-t'ow 侖頭 possibly represents Darsila i.e. Cleft-rock; compare K'wen-lun for Gandhara.

he was apprehensive of the consequences of interrupting their march, and only succeeded in getting them to Yuan by a ruse.

On their arrival they set to to divert the water courses, so that the inhabitants shut up lost heart. The siege was pressed for forty days when the outer city was stormed. The chief men and the officers in command were much harrassed at the loss, and the people in great trepidation retired within the inner city, where the chief men had a consultation. They represented that the reason of the Chinese attack on the city was that the King Mû-kwa 毋寡 had refused to give up the *shen* horses, and (had instigated) the murder of the envoys. If therefore they killed the King and sent out the *shen* horses, the Chinese troops could scarcely refuse to accept their submission. If on the other hand they did not come to terms the contest would be carried on to the death.

Before evening the principal inhabitants all expressed their assent; they killed their King Mu-kwa, took his head and sent it with their chief men to the Urh-shi General. They told him that if he would spare the lives and properties of the citizens they would send out as many of the *shen* horses as were required, and would supply the Chinese troops with provisions. If on the other hand he would not agree to their proposal they would then kill the *shen* horses, and request the people of K'ang-ku to come to their assistance. They then with their own forces inside the city, and those of K'ang-ku without, would be well able to meet the Chinese in battle.

The Chinese generals consulted together as to what course to pursue. Meanwhile the Prince 侯 of K'ang-ku had come to reconoitre the Chinese force, but it being still in good condition he had not dared to enter the city. The Urh-shi General took counsel of Chao Shi-ch'eng and Li-chi. They learnt that within the city they had recently obtained the services of some men from T'sin, who knew how to sink wells, while provisions were still abundant. Come what might they had cut off the head of the obnoxious Mu-kwa, and it had arrived in camp. If they did not agree to the terms proposed, they would have to take measures for their own defence, as the prince of K'ang-ku as soon as the Chinese soldiers were exhausted, was ready to come to the assistance of Yuan, in which case their army must be exterminated.

The various generals accordingly agreed to accept the terms proposed, and a convention was entered into with Yuan that



the latter should send out the *shen*<sup>37</sup> horses, which the Chinese should have the right of selecting, and that they should in addition fully provision the army.

The Chinese General took of the *shen* horses some ten individuals, besides of medium and inferior qualities about three thousand horses and mares. They likewise selected from among the grandees of Yuan, one who had in previous time entertained in a friendly manner the Chinese envoys, by name Mui-t'sai<sup>38</sup> and set him up as King of Yuan.

On their side the Chinese stipulated that they would withdraw the troops without entering the inner city; and would cease hostilities and lead them back to China.

As the army was numerous, and no provisions were to be had for so many along the road from Urh-shi to the districts immediately west of Tun-hwang, the army was divided into several sections, which followed respectively the northern and southern routes. Wang Shen-sang with about a thousand retired through the districts of Hung-lu 鴻臚 and Wu-ch'ung 壹充<sup>39</sup> to Yuk-ch'eng; they found the city closed, and the inhabitants unwilling to provide supplies. Wang Shen-sang went on some two hundred *li* in advance of the main army with a body of light horse in order to reconnoitre. He made a requisition on the town for provisions but was refused. The people in the town knew through their spies that the troops with Wang were but few; at daylight they march out 3,000 strong and cut to pieces his escort. A few only escaped to the Urh-shi General. The General ordered the troops under the command of San-suh and Kih to destroy Yuk-ch'eng; the King fled to K'ang-ku whither he was pursued by Kih. The people of K'ang-ku hearing that the Chinese had taken Yuan, and had driven out the King of Yuk-ch'eng delivered him up to Kih.

Kih ordered four cavalry officers to take him bound to the general-in-chief. The four consulted altogether. "This" they said "is the King of Yuk-ch'eng who has inflicted so much loss

37 Shen horses 善馬. Is it possible that these are connected with the celebrated Nessian horses of Strabo and the other Greek writers? Strabo XI., XIII., says:—Τοὺς δὲ Νησαίους ἵππους, οἷς ἐχρῶντο οἱ βασιλεῖς ἀρίστοις καὶ μεγίστοις. See also Herod VII. 40. Possibly like grapes the race was introduced through Bactria from W. of the Pamir.

38 昧蔡 Mu-t'sai apparently Malsalya i.e. Bolophoros, Saggitarius; so Mu-kwa is possibly Mahavira.

39 Apparently representing some such forms as Hariurva, terra gilva, and Ugrajara, male dura.

in our troops. So long as he lives he will be a source of trouble, let us kill him and finish the affair." They wished to kill him but each feared to be the first to strike. The Shang-kwei cavalry officer, Chao's younger brother was a young man; he draw his sword killed him and cut off his head. He was sent on by Kih to communicate the fact to the general-in-chief.

After the Urh-shi General had set out the Emperor sent an envoy to Wu-sun requesting it to assist him in the attack on Yuan; Wu-sun in response sent 2,000 cavalry. They were now placed in a dilemma, and did not wish to proceed as the Urh-shi General had retired to the east. The smaller states through which the the army passed when they heard that China had conquered Yuan all sent the sons or younger brothers of their ruling chiefs along with army to pay tribute to the Emperor and remain as hostages at the court.

Great rewards were bestowed on the Urh-shi General for his success at Yuan, and on the Kiun-ching, Chao Shi-ching, for his bravery on battle; as well as on Kih for the courage he displayed in entering K'ang-ku, and on Li-ch'i for his wise counsel. The army entered the Yuh-men about ten thousand strong with a thousand horses; the Urh-shi General bringing up the rear.

The army had been abundantly provisioned, and those who died in battle could not be many. The generals were, however, avaricious, and many of the troops cared very little for their officers and fell to plundering, and this caused some disturbance. The Emperor, as it had marched ten thousand *li* to the capture of Yuan and had returned successful, took no further notice of the irregularity. He invested Kwang-li as Marquis of Hai-si, and the younger brother of Chao, the cavalry officer who had killed the King of Yuk-ch'eng, he made Marquis of Sin-c'hi. The Kiun-ching Chao Shi-c'heng was made Kwang-luh Ta-foo, and the Shang-kwan Kih, Siao-foo. Li-chi was made Shang-tang T'ai-show, and three of the other generals made high officers of the ninth grade.

To each of the Marquises who had an income of 2,000 shih 100 hundred men were allotted, and a thousand were distributed amongst those with less than 1,000 shih. In view of their strenuous exertions all were rewarded beyond their hopes and fully contented were permitted to retire. 40,000 pieces of gold were distributed amongst the troops, and those who had taken active part in the operations against Yuan received four years furlough. After the victory at Yuan the Chinese general had set up Mui-t'sai as King, and immediately after departed. Scarcely a

year had elapsed when the principal men of the city finding that Mui-t'sai was nothing but a feeble tool, sent an envoy to China asking permission to kill him. This being accorded they put him to death, and raised to the vacant throne a brother of Mukwa named Shen-fung, and sent his son to China as an hostage. To preserve the good understanding, an envoy was despatched in return with costly presents, and more than ten caravans were sent to the countries lying west of Yuan to seek for articles of *vertu*.

In order to keep Yuan under control Fung-lan was appointed Tu-wei of Tun-hwang and T'siu-tsiuen. Westwards as far as the Im-shui (salt water *i.e.* Lake Lob) rest houses were established. At Lun-t'ow a hundred agricultural officers were appointed, for the purpose of encouraging the cultivation of millet and corn to supply the caravans on their way to or from foreign countries.

## INDEX OF LOCALITIES MENTIONED IN PRECEEDING PAPER.

An-jen .....	晏然	Ariana.....	18
An-Sik.....	安息	Parthia .....	8
Ho-si .....	河西	Shen-si &c. ....	11
Hung-lu .....	鴻臚	see Wu-chung.....	25
Hwan-t'sim .....	驢潛	Kharism .....	18
Hwan-ya .....	渾邪	In present pro. Kansuh ...	11
Im-shui .....	鹽水	Lake Lob .....	5
Im-t'sai .....	奄蔡	} Samarkand .....	7, 8
or Im-t'sai-li-kan .....	奄蔡黎軒		
Joh (Yok) shui .....	弱水	Lake of Hamun .....	9
Kan-mi, see also Yu-mi	扞采	A kingdoms.e. of Lake Lob	5
K'ang-ku .....	康居	Riang-kul .....	6
K'i-lien-shan .....	祁連山	T'ien shan (part) .....	11
Kiao-t'sze .....	驕僥	Arachosia .....	18
Kien-wei .....	犍爲	A town in Szechuen .....	10
Kiung-pak .....	卬焚	do. ....	id
Kam-ch'eng .....	金城	A town in Kansuh.....	11
Ku-sze.. .....	姑師	A kingdom near Lake Lob	5, 6
K'wen-lun .....	崑崙	Mts. of Gandhâra .....	9, 18
Kwai-shui .....	焉水	River Oxus.....	4
K'wen-mings .....	昆明	A Tribe in Szechuen...10,	15
Lam-shi-ch'eng .....	監市	Capital of Bactria .....	9
Lu-yût.....	呂越	.....	15
Lân-tow .....	侖頭	A places.w. of Lake Lob...	23
Low-lan .....	樓蘭	A kingdoms.e. of Lake Lob	5, 16
Mang .....	駝	A locality in Szechuen ...	10
Nam-shan .....	南山	A locality in Kansuh.....	11
Sham-lai.....	沈黎	See Yang-ho .....	
Shen-tuh .....	身毒	Scinde.....	9
Shuk .....	蜀	Ancient name for Szechuen	9
Si-ping .....	西拉	A place in Kansuh .....	11
Si-wang-mu .....	西王母	A fabulous being .....	9
Su-hiai .....	蘇薤	A small state lying E of	
		Yarkand .....	18
Sui .....	嵩	Now Likiang-fu in Yunnan	10
Ta-hia .....	大夏	Tochâristan.....4, &c.	
Ta-yik .....	大益	Derbices .....	18



Tai-tsoks.....	氏 倮	A Tribe in Yunnan .....	10
T'iao-chi.....	條 枝	Sarangia .....	8
T'in-yût .....	滇 越	Sthâneswara or N.E. India	10
Tsiu-t'siuen .....	酒 泉	A district in Kansuh .....	15
Tu-kwai-shui .....	都 嬌 水	Kiver Surkhab .....	4
T'u .....	越	A locality in Szechuen ...	10
Urh-shi-ch'eng .....	貳 師 成	Yarkand .....	20
Wan-shan .....	汝 山	A district in Szechuen ...	15
Wu-chung .....	壺 充	A district near Yukch'eng	25
Wu-suns .....	烏 孫	The Asiani .....	6, 11
Yang-ho .....	牂 牁	A newly founded district in Szechuen .....	15
Yen .....	冉	A place on the borders of Szechuen .....	10
Yik-chow.....	益 州	See Yang-ho .....	
Yu-mi .....	扞 罽	The more correct form of Kan-mi, q.v. ....	
Yu-t'ien .....	于 隴	Khoten .....	5
Yuan or Ta-yuan .....	宛 or 大宛	The Kingdom lying E. of the Pamir, of which Yar- kand was the capital...4, &c.	
Yueh-ti .....	月 氏	Ephthalitæ .....	4, &c.
Yuk-ch'eng .....	郁 成	A city of Turkestan .....	22
Yût-sui .....	越 稽	See Yang-ho .....	





**PAGE NOT  
AVAILABLE**



## ARTICLE II.

### ROCK INSCRIPTIONS AT THE NORTH SIDE OF YENTAI HILL.

(By J. RHEIN, Esq.)

On the North slope of Yentai Hill lies,—often unheeded by passers by,—one of those curious acts of Nature, not seldom seen in mountainous countries where volcanic eruptions, coupled with influence of rain and weather, have shaped the aspect of hills and dale. It is simply an obelisk-shape granite standing perpendicular in the hill-side and in its front another horizontal—lying broad flat stone in the form of a table. The latter seems like a piece sliced off from the top of the standing Rock and deposited at its foot on another mass of granite, keeping balancing on them like the loose board of a huge table. This rock is known by the Chinese under the name of Shih-Chu'an 石船.

On these two stones are chiseled the following characters, dating from the 36 year of K'ang-hi (1697).

#### CHARACTERS ON THE TABLE ROCK.

交虹劉九標題并書

康熙丁丑秋

卻笑膠舟遊梵水  
問王空自動齊侯

雖無槳舵勢能悠  
難供利客奔南北  
止許高人宴夏秋

誰將石壁劈成舟  
屹立山腰海上頭  
縱有風濤驚不到

CHARACTERS OF THE OBELISCAL ROCK.

康熙丁丑仲夏之吉

造化奇觀

關中崔巖祁國祚題并書

The following are the characters of later date chiseled under the preceding on the Obeliscal Rock :—

一帆里乘長風壯志雄添海  
浪片石巍巍參造化天工端  
不藉人工

同治壬申年冬月由

京返棹之眾觀石船題句

上杭笏初丁錦堂題

同安萱山蔣長庚

同治五年正月十七日

歸安沈丙瑩

徐昭徐立言

桐城李經

吳縣潘廣宸

大興李鍾陽

海甯陳光綬同遊至此

吳縣陶懷臬

薛應珍

洪鈞後至

*Translation of the Inscriptions on the Obeliscal Rock.*

"A Phenomenon of Creation wonderful to behold."

"On an auspicious day of the fifth month of the 36th year of Kang-hi (1697), composed and written by Ch'i-kwoh-tsu surnamed Ho-yen from Kwan-chung (Shensi)."

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*Inscriptions of Later Date, under the Preceding.*

"A said for 10,000 li driven by wind, firm and brave to the utmost amidst the waves of the sea (meaning the vessel in which the composer of this verse returned from Peking; speaking of the stone at the North side of Yentai Hill called the stone-junk, he says): 'A stone so high and lofty may be considered creation; it is Heaven's work, whereby the work of man has not been invoked.'"

"In 10 month of the 11 year of T'ung-chi (November 1872) on his return with a vessel from Peking to Chefoo and seeing the 'Stone Junk' this verse was composed by Ting Chin-tang surnamed Hu-chu from Shang-hang-hsien (Ting-chow fu in Fuhkien); and written by Chiang Chang-keng surnamed Hsuen-shan from T'ung-an-hsien, (Chuen-chow-fu in Fuhkien)."

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*Names of Visitors to the Rock, although of Earlier Date, Written to the Left of the Preceding.*

"On the 17th day of 1st month of the 5th year of T'ung-Chi, (3rd March, 1866). Shen Ping-ying; Hsü-Chaü and Hsü Li-yen from Kwei-an-hsien (Hu-chow-fu in Cheh-kiang). Li-ching, from T'ung-cheng-hsien (An-ching in An-hwei). Pan Chang-heng from Wu-hsien (Soo-chow-fu in Kiang-su). Li Chang-yang from Ta-hsing hsien, (Shün-tien-fu in Chihli) and Ch'en Kwang-shou from Hai-ning-hsien (Hang-chow-fu in Cheh-kiang) have together visited this place."

"T'au Hwai-kao, Hsueh Ying-chen and Hung chün, from Wu-hsien (Soo-chow-fu in Kiang-su) have visited it afterwards."

*Translation of the Transcription on the Side of the Table-Rock or  
 "Stone Junk," Written in the Autumn of the same Year as  
 the Large Characters on the Obeliscal Rock.*

"Who took this stone wall and tore it asunder making this vessel and depositing it in the slope of the hill above the sea? Although wind and waves may roar she cannot be terrified; although without oars or rudder she can keep her course for ever. Although gain seeking merchants cannot travel in her from North to South, yet the Poet can feast on her in Summer and in Autumn, and forsooth laugh at the glued ship which wandered in the waters of Tsu, where the Marquis of Ts'i made in vain enquiries for his King."\*

"In the Autumn of the 36th year of Kang-hi (1697), composed and written by Liu Chiu-Piao, surnamed Chiao-hung."

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\* This has reference to the glued vessel which the Prince of Tsu (at present the provinces Hunan and Hupeh) treacherously provided for Chao Wang, the fourth King of the Chow dynasty (who reigned from 1052-1001 B.C.), when he came over to the Kingdom of Tsu for a pleasure-trip, and was drowned by the foundering of the glued vessel. This was kept secret for the Princes of the different feudal Kingdoms, but the Marquis of Ts'i (now the Northern port of Shantung and Southern port of Chihli), made enquiries after the King and accused the people of Tsu of that treacherous act. (Annals of Confucius, commentary of Tso Ch'iu-ming, 4th year of Lu Hsi-kung 春秋左氏傳魯僖公四年昭王南征句註.)  
 Mayers Chinese Reader's Manual.



### ARTICLE III.

## SIAMESE COINAGE.

BY JOSEPH HAAS.

The country known to us as *Siam* is by the natives called *Muang Thai* (Kingdom of the free). Its ancient name was *Sajam* (tawny race), whence that of Siam has been derived.

Beyond the scanty and somewhat mythical information which is to be found in the collection of the sacred books of the *Thai*, called *Trai-pidok* i.e. the three vehicles by which we have to traverse the great Ocean of this world, little is known of the ancient history of Siam.

The collection above referred to is divided into three series: viz., *p'ra-vinai* (rules), *p'ra-sut* (sermons and histories) and *p'ra baramat* (philosophy). It forms a total of 402 works in 3683 volumes. These are written in the Pali language, but a great many of them were translated into Siamese.

Some contribution to the knowledge of the ancient history of Siam may also be gained in searching the Annals of the country which are divided into two parts: the first, in 8 volumes, entitled *Phongsavada-Muangnua*, or History of the Northern Kingdom, gives the origin of the *Thai*, but is also full of fables and myths. The second part *Phongsavada-Muang Thai*, History of the Kingdom of Thai, or as it is called officially *Phongsavada-Sajama Rahcha*, History of the Siamese Kings, in 40 volumes, begins with the foundation of *Ayuthia*, and carries us down to the present time.

When we consider that Siam is almost the equal of China on the scale of civilisation and that she even boasts of a more perfect system of coinage than her sister country, this paucity of numismatic records is remarkable.

Some time ago our Honorary Member, Marques A. Pereira, Consul General of Portugal in Siam, in a pamphlet\*, produced some valuable, but unfortunately incomplete, notes upon the subject; and to this source I am indebted for information regarding the stamps on the former Siamese coins. I have also consulted with advantage the "*Siam Directory*," compiled by Mr.

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\* *Moedas de Siam* por Marques A. Pereira—1879—Lisboa—8vo. 30 pag.

Samuel J. Smith, for the chronological table of the Kings of Siam.

With the knowledge obtained from these various sources, together with the results of personal investigations during my recent visit at Bangkok, which I may remark have not been entirely fruitless, I make bold to appear before you with this essay on Siamese coins.

As in the numismatics of every country, so also in that of Siam the knowledge of her history is essential. Unfortunately, however, the earlier history of Siam is shrouded in an almost impenetrable mythical veil, and only from the time that *Ayuthia* was built we step into real historical facts.—We are informed that the original capital of Siam was *Sangkalok*, then *Picheluk*, and at last *Ayuthia*, which was built in the *Chula* Era 712, corresponding with A.D. 1850. With this era we commence our chronological tables—extending over the last 600 years.

The Siamese distinguish two eras, either of which is mentioned when quoting dates,—namely, the sacred and the civil era.

The former is called *P'utt'a-sakaraht* (or Buddha's era), and is reckoned from the reported death of Buddha. At the full moon of the sixth Siamese lunation, *i.e.* April 23rd, 1880, the era will have closed its 2423rd year. It antecedes the Christian era 543 years, and as the term given it implies, its application is entirely confined to religious matters. Every time a Siamese priest reads or recites one of his homilies, he is very particular to state the number of year Buddhism has existed up to date, and how long it will continue to exist, which Buddhists believe will be 2577 years after the date above mentioned.

The other is the Civil era, or the *Chula-sakaraht*. It begins from the time when King *P'ra Ruang* established it in A. D. 638. On the last day of the fourth Siamese lunation, *i.e.* March 10th, 1880, it will close its 1241st year, thus corresponding with the 638th year of Christian era.

*Some events in Siam's history before Ayuthia was built, say about 500 B.C.—Bathamarat a grand son of Sachanalai and Sithimongkhon built the city of Savan-thevalok, or Sangkalok, and thereupon he was proclaimed King. In short succession three more cities sprang up under his creation: viz., Haripunchai, Kamphochana, and Phetchabun, and each received as King one of his sons, of whom he had Sokha-kuman, Thama-kuman, and Singha-kuman.*

This dynasty flourished for about 500 years, during which period no mention is made of troubles or wars in the country.

About the year 950 of the era of *P'ra-khodom* there reigned at *Haripunchai* the King *Ap'ajakha Muni* whose son *Arunnarat* by marriage was elevated to the throne of *Sangkalok* under the name of *P'ra Ruang*.

At this time the country of the *Sajam* was under the rule of the King of *Kamphocha-Nakhon* who gradually drifted into the vasallage of *P'ra Ruang*. When the latter monarch attained the fiftieth year of his age he established the Civil era or *Chula-sakaraht*.—His reign is also marked by the first clash of arms with China; and here also we hear of the first settlement of Chinese in Siam.—

The succssion fell to his son *P'raja Sucharat*, during his reign great wars were raging between the *Thai* and the *Lao*.

Then *Thama-Trai-Pidok* builds the city *Phitsanulok*, makes *Chao-Kraison*, one of his sons, King of *Lophaburi*, and the other one *Chat Sakhon*, King of *Chieng-mai*.

*Khota-Thevarat* takes refuge at the borders of the *Menam*, and *P'raga-Krek* ascends the throne.

*P'ra-Chao-Uthong* builds on an island the city *Krung-Thep-Maha-Nakhon-Si-Ajuthaya* which becomes afterwards famous under the name of *Ayuthia*.

## THE KINGS OF SIAM.

FROM THE TIME THE OLD CAPITAL AYUTHIA WAS BUILT.

### 1st Dynasty.

Name.	Chula Era.	Ascension A. D.	Lenght of Reign.		
			Years.	Ms.	Days.
1.—Sómdetch P'ra Rahmah T'i-baudee 1st .....	712	1850	20	—	—
2.—Sómdetch P'ra Rähme-súan 1st, son of the 1st and King of Lophaburi .....	782	1870	1	—	—
3.—Sómdetch P'ra Boroma-Rah-ch'ah T'iraht, brother of the 2nd .....	782	1871	18	—	—
4.—Chóu-Oö, T'uang-làn, son of the 3rd .....	744	1883	—	—	7

Name.	Chula Era.	Ascension A.D.	Length of Reign.		
			Years.	Ms.	Days.
5.—Sómdetch P'ra Rahme-súan, the 2nd, assassinated the 4th, his brother .....	744	3183	16	—	—
6.—Sómdetch P'rayah P'ra Ràhm, son of the 5th .....	759	1398	5	—	—
7.—Sómdetch P'ra Nak'auu In...	763	1402	18	—	—
8.—Sómdetch P'ra Boroma Rah- ch'ah Tiraht, son of the 7th	780	1419	17	—	—
9.—Sómdetch P'ra Boroma Trai Lohkanáht, son of the 8th.	796	1435	16	—	—
10.—Sómdetch P'ra Boroma Rah- ch'ah, son of the 9th .....	811	1450	22	—	—
11.—Sómdetch P'ra Rahmah T'i- baudee, the 2nd, son of the 10th .....	832	1471	40	—	—
12.—Sómdetch P'ra Boroma Rah- ch'ah Maháh P'ut-t'ang, son of the 11th .....	871	1510	5	—	—
13.—P'ra Ratsat'a T'irath, son of the 12th, 5 years old ....	875	1514	—	5	—
14.—Sómdetch P'ra Ch'ai Rah- ch'ah Tiraht, son of the 12th .....	875	1514	15	—	—
15.—P'ra Yáut Fah, son of the 14th, aged 11 years..... His mother <i>Si-Suda-Shan</i> , was Regent of the kingdom. Her lover <i>K'un Wara- wongsáh T'iraht</i> slew the 15th king and usurped the throne, reigning only 5 months. Being an usurper, his name is not allowed to appear in the annals of the Siamese Kings. He was assassinated by <i>K'un Pi- rena-t'ep</i> . The high digni- taries of the kingdom then	889	1528	2½	—	—



Name.	Chula Era.	Ascension A.D.	Length of Reign.		
			Years.	Ms.	Days.
placed on the throne <i>P'ra T'eean Rahch'ah</i> , an uncle of the late king. His name was					
16.— <i>Sómdetch Maháh Chakra-p'atdi Rahch'ah T'iraht</i> ...	891	1530	27	—	—
17.— <i>Sómdetch P'ra Mahint'a Rahch'ah T'iraht</i> , son of the 16th .....	917	1556	1	—	—
The capital of the kingdom was taken in 918 by the King of <i>Kongsáh-wadee</i> or Pegu.					
18.— <i>Sómdetch P'ra Maháh T'ama Rahch'ah T'iraht</i> .....	918	1557	23	—	—
19.— <i>Sómdetch P'ra Nare-súan</i> , son of the 18th .....	940	1579	6	—	—
20.— <i>Sómdetch P'ra-Ekah-Totsarot</i> , a younger brother of the 19th .....	945	1584	19	—	—
21.— <i>Chón Fah Sri-sáwa-p'ahk</i> , son of the 20th, .....	964	1603	1	—	—
called the "one-eyed," succumbed to a conspiracy. Here closes the dynasty of <i>Sómdetch P'ra Rahmah T'ibaudee</i> , comprising 21 different kings and one usurper.					
<i>2nd Dynasty.</i>					
22.— <i>P'ra Chón Song T'am</i> , uncle of the 21st .....	964	1603	26	—	—
acquired a great name by his pretended discovery of Buddha's footprint at <i>P'ra-baht</i> .					

Name.	Chula Era.	Ascension A.D.	Length of Reign.		
			Years.	Ms.	Days.
23.—P'ra Ch'etáh T'iraht Otarot, an elder brother of the 22nd ..... The Prime Minister <i>Chòu</i> <i>P'raya Kalahòme Sri-suri-</i> <i>wong</i> assassinated the 23rd and placed on the throne.	989	1628	1	7	—
24.—P'ra Aht'itaya-wong, a bro- ther of the 23rd, 9 years old..... Here ends this dynasty of 3 reigns, the 2nd and 3rd of which, however, were mere- ly nominal, the power be- ing actually held by <i>P'raya</i> <i>Suriwong</i> , the Prime Minis- ter. <i>3rd Dynasty.</i>	992	1630	—	5	—
The former king was driven from the throne by the Siamese Nobles and Lords, and his place filled by the Prime Minister above- mentioned, who assumed the title of					
25.—P'ra Chón Prasäht T'aung...	992	1630	26	—	—
26.—Chouí Fah Ch'ai, son of the 25th .....	1017	1655	—	9	—
27.—P'ra Sri-sut'ama Rahch'ah, killed his nephew, the 26th	1018	1656	—	2½	—
28.—Sómdetch P'ra Narai, son of the 25th, killed the 27th... under his reign Constantin Falcon, a native of the Jonian island Cephalonia, originally a sailor, becomes Prime Minister. Christian- ity makes rapid spread,	1018	1656	32	—	—

Name.	Chula Era.	Ascension A.D.	Length of Reign.		
			Years.	Ms.	Days.
and foreign factories are established in Siam; a great development of trade between Siam and foreign countries takes place and several embassies between France and Siam are sent and received.					
29.—P'ra P'et Rahch'ah ..... is called an usurper, and is not allowed to rank with the legitimate kings.—Constantin Falcon becomes the victim of his murderous designs, and all the seeds of civilisation introduced by his predecessor are rooted out. Notwithstanding, this sovereign sends an embassy to France.	1050	1688	9	—	—
30.—P'ra P'utt'a Chóu Tu'a, son of the 28th .....	1059	1697	10	—	—
31.—P'ra Chóu Yü Hua Tái Sái, son of the 30th.....	1069	1707	26	—	—
32.—P'ra Chóu Yü Hua Boroma-Koht, brother of the 31st...	1094	1732	26	—	—
33.—Chóu Fah Däuk-madü'a, son of the 32nd .....	1120	1758	—	—	10
Taking to the vocation of Buddhist priest abdicates in favour of his brother					
34.—P'ra Chóu T'inang Suriya Marintara.....	1120	1758	9	—	—
with him ends the dynasty of <i>Prasäht T'aung</i> , represented by 9 kings, the usurper being excluded.					
The reigns of the above named					

Name.	Chula Era.	Ascension A.D.	Length of Reign.		
			Years.	Ms.	Days.
<p>34 kings extend in the aggregate over a period of 417 years, so that on an average 123 may be counted to each.</p> <p>In 1767 the Burmese plundered and looted the capital, after a siege of two years, and carried away many captives. The king succeeded to escape from <i>Ayuthia</i>, but, finally abandoned by everyone, he lost himself in the forests, and there died of hunger and misery.</p> <p>The chief of the Siamese army <i>P'rayah Tahk</i> rallied the Siamese at <i>T'onaburee</i> (now the site of H. R. H. <i>T'oon Kramäüm Ong Yai's</i> place), where he built the city of <i>Bangkok</i>, and reigned as the</p>					
<p>35.—King <i>P'rayah Tahk-sin</i> .....</p> <p>This is one of Siam's most glorious reigns on record.—Towards its end, however, the king became insane—through poison, it is supposed, administered to him by jealous statesmen. He spent the eve of his life in a Buddhistic monastery and there ended, assassinated by his successor.</p>	1129	1767	15	—	—



Name.	Chula Era.	Ascension A.D.	Length of Reign.		
			Years.	Ms.	Days.
The 4th and present Dynasty.					
The Prime Minister, also a General of great celebrity under <i>P'rayah Tahk-sin</i> ascended the throne under the name of					
36.—Sómdetch P'ra Boroma Rah-ch'ah P'ra P'utt'a Yaut Fah .....	1144	1782	27	—	—
37.—P'ra P'utt'a Lo't-láh, son of the 36th .....	1171	1809	15	—	—
38.—P'rahaht Sómdetch P'ra Nang Klów, son of the 37th.....	1186	1824	27	—	—
39.—P'rahaht Sómdetch P'ra Paramendr Maháh-mongkut, brother of the 38th .....	1213	1851	17	—	—
40.—P'rahaht Sómdetch P'ra Paramendr Maháh Chulah-long-korn Klów, the present king, son of the 39th..	1230	1868	12	—	—

These chronological tables, with the addition of some of the most important events, may be said to give us a fair general outline of the history of the country, in which we are thus enabled to distinguish two prominent and important Epochs: viz., one from the time the old city *Ayuthia* was built, A.D. 1350, up to the time of its destruction by the Burmese, A.D. 1767, and the second, or *new epoch*, beginning with the rise of the city of *Bangkok*, as the Capital of Siam, or say A.D. 1782, to the present time.

Proceeding to the next and important subject, that relating to the description of Siamese money, I append the following table:—

<i>Name of Money.</i>	<i>Description.</i>		<i>make.</i>
<i>Bi'ah</i> .....	Sea shells, known as the cowry, — existed previous to and during the reign of the 38th king, 1824-50. Their value varied according to the supply in the market, sometimes there would be 1,500 <i>Bi'ah</i> to a <i>Fu'ang</i> , and at other times more or less. The legal value fixed by the Government was 800 <i>Bi'ah</i> for one <i>Fu'ang</i> .	50 <i>Bi'ah</i> .....	1 <i>Solot</i>
<i>Solot</i> .....	Copper .....	2 <i>Solots</i> .....	1 <i>At</i>
<i>At</i> .....	ditto .....	2 <i>At</i> .....	1 <i>See-o or Pai</i>
		200-450 <i>Bi'ah</i>	1 ditto.
<i>See-o or Pai</i>	ditto .....	2 <i>See-o or Pai</i>	1 <i>Seek</i>
<i>Seek</i> .....	ditto .....	2 <i>Seek</i> .....	1 <i>Fu'ang</i>
		1 <i>Seek</i> .....	32 <i>Saga or red beans</i>
<i>Fu'ang</i> .....	=\$0.075, Silver .....	2 <i>Fu'ang</i> .....	1 <i>Salu'ng</i>

<i>Name of Money.</i>	<i>Description.</i>		<i>Make.</i>
<i>Salu'ng</i> ...	=\$ 0.15, do. —the equivalent of one Chinese Tael, so that 5 Siamese equal 8 Chinese Taels.....	4 <i>Salu'ng</i> .....	1 <i>Baht or Tical</i>
<i>Tical</i> .....	Since the last reign = \$0.60, or 5 Ticals are equivalent to 3 Mexican Dollars—Silver.	4 <i>Baht or Tical</i>	1 <i>Tamlu'ng</i>
<i>Tamlu'ng</i> ...	=\$2.40, Silver .....	20 <i>Taml'ung or</i> 80 <i>Baht</i> ...	1 <i>Chang</i>
<i>Chang</i> .....	=\$48, but this denomination only represents a weight; the same with the two following. The <i>Chang</i> is equivalent to two Chinese Catties, or 2½ English pounds .....	50 <i>Chang</i> .....	1 <i>Hahp</i>
<i>Hahp</i> .....	=\$2,400 .....	100 <i>Hahp</i> ...	1 <i>Pahrah</i>
<i>Parah</i> .....	=\$240,000		

The above table condensed gives the following schedule, viz :—

1 Chang	=20 Tamlu'ng	=80 Tical	=320 Salu'ng	=640 Fu'ang	=1280 Songpei	=2560 Pai	=5120 At
	1 Tamlu'ng	= 4 Tical	= 16 Salu'ng	= 32 Fu'ang	= 64 Songpei	= 128 Pai	= 256 At
		1 Tical	= 4 Salu'ng	= 8 Fu'ang	= 16 Songpei	= 32 Pai	= 64 At
			1 Salu'ng	= 2 Fu'ang	= 4 Songpei	= 8 Pai	= 16 At
				1 Fu'ang	= 2 Songpei	= 4 Pai	= 8 At
					1 Songpei	= 2 Pai	= 4 At
						1 Pai	= 2 At



It will be seen from the foregoing tables that the denomination of the coin determining the weight thereby indicates the value, and such is the case with most coins of East Asiatic countries.

The Siamese standard of weight is double that of the Chinese. The equivalents of Siamese weights are :

4 Ticals make 1 Tael,  
 20 Tael     ,,     1 Catty = 2 lbs. 9 oz. 4½ dwts. av.  
 50 Catties or 80 Tical make 1 Picul = 129 lbs. av.

I have been unable to trace any coins from the first and second dynasty, and it still remains an open question whether such existed.

The oldest coins, of which specimens remain, date from the 3rd dynasty (1680-1780) and were made at *Ayuthia*, then the capital of the kingdom.

Until the reign of the 4th king of the present dynasty, silver coins, with but one exception to which I shall refer latter on, had the shape of bullets or that of a Buddhist wooden fish (木魚 *Mu-yü.*) It is not at all unlikely that the *Cowry Shell*, the original medium of exchange in the country, suggested the adoption of of that odd shape.

The black appearance of some of the oldest coins is caused by the frequent practice that prevailed among the people in times of war,—especially so during the invasion of the Burmese in 1787—of burying their treasures in the earth which is said to be impregnated with sulphur.


The exception above mentioned occurred during the reign of the 2nd king of the present dynasty, when the *Fu'angs* were made flat and round.


The former or bullet-shaped coins bear two impressions (*Kra*, stamps), the upper one represents a "wheel" or a "star" and is the stamp of the mint, while the lower one represents the stamp of the reigning king.

Although the names of some of these stamps are known, it is impossible to deduce therefrom the *year* of their mintage.

The stamps (*Kra*) indicating the reign of the different kings are classified as follows:—

#### I. COINS OF AYUTHIA.

 *Kra-Chang*, the "Elephant" Stamp;

 *Kra-Bet*, the "Fish-hook" Stamp;



*Kra-Dockmei*, the "Flower" (Lotus) Stamp ;



*Kra-Kri*, the "Three-pronged Spear" Stamp, called also *Kra-Son*, "Fork" Stamp, which originates from the reign of *Pirayah Tahk-sin* the regenerator of Siam and the founder of Bangkok.

## II. PRESENT DYNASTY.

### 1st King.



*Kra-Bua*, the "Lotus Flower" Stamp ;



*Kra-Chak*, the "Sling" Stamp.

### 2nd King.



*Kra-Krut ok-san*, the "Large King of Birds" Stamp ;



*Kra-Krut ok-yau*, the "Small King of Birds" Stamp.

### 3rd King.



*Kra-Keng*, the "Royal Pavilion" Stamp ;



*Kra?*

### 4th King.



*Kra-Kunto*, the "Gobblet" Stamp ;



*Kra-Mongkut*, the "Crown" Stamp.

Besides the above mentioned flat silver-coins, made during the reign of the second king, others of the same shape, for general circulation, were issued for the first time by order of the 4th

king of the present dynasty in two different coinages; on the first the avers shows the Royal crown between two Parassols,



(Seal of the First King, representing the Royal crown and the Parassols), and the reverse bears an elephant within the crest; the second coinage is of the same design, but is of a superior workmanship. These coins were made also at the beginning of the reign of the present (5th) king, while under the tutelage of the Regent.

I have next to review the present coinage which is superior to anything of the kind yet produced in Siam. This marked progress, however, is principally due to the dies having been

made in London. With the silver coin the obverse bears the portrait of the young king, the reverse the Siamese Arms, and for the first time we see a Siamese coin with an inscription and a properly milled border.



For general use minting is at present confined to silver and copper coins; of the former there are pieces of the value of 1 Tical, 1 Salu'ng, and 1 Fu'ang; of copper coins: pieces of 4, 2, 1, and  $\frac{1}{2}$  At.

Gold is only coined for the King, who on great state occasions, such as cremation-ceremonies, coronation etc., distributes gold coins together with silver coins of 4 and 2 Tical, 2 Salu'ng, Songpei, Pei and At;—the former are therefore rare and highly prized by the people. In other respects the gold coin does not differ from that of silver and copper, it bears the same stamp and is named after its weight.

The value of coined gold is fixed at 16 times its weight in silver.

The Kingdom of Siam has at present *one* Mint where coins of precious metals are made, namely at *Bangkok*. Siam has a number of gold mines, those at *Bang-tapahn*, "are said to contain the very purest gold of the country. Most of the native gold of Siam is used in manufacturing those gold vases, water gobblets, teapots, cigar boxes, and other costly utensils, which the Kings of Siam usually present to the distinguished men whom they honour with high official positions. A considerable amount of gold leaf is imported from China mostly to be manufactured into jewelry."

"Heretofore the Siamese have not known that silver could be obtained from their many and varied mines in the country. They depended entirely on Foreign silver or silver money which the Siamese Government remelted and then manufactured into Ticals, Salu'ngs and Fu'angs."

The export trade of the country is greatly in excess of the import trade, and foreign merchants must import foreign coin to



effect their purchases. To this drawback was added the unwillingness of the people to accept foreign coins in payment for their commodities; hence the importer of such coin had to apply to the Government to effect an exchange for native money. Supposing Dollars were presented at the Mint, they were passed over the fire sufficiently to obliterate all marks of their origin and then a Siamese Mint officer placed 80 Ticals of a given weight on the scales and received in exchange the same weight of defaced Dollars—less  $4\frac{1}{2}$  Ticals Mintage money. When the Siamese mint people remelted these Dollars, they added lead enough to make up for any loss that might result from remelting.

This was the usual method for exchanging Dollars for Ticals till the reign of H. M. Sômdetch P'ra Chaun Klôw, the late King. He established the standard of 5 Ticals to 3 Mexican Dollars, and ever since importers exchange their "Mexicans" without difficulty. The mint officers fire the dollars, and if found genuine, five silver Ticals are given for every three Dollars without any further loss of time.

The fineness of the precious metals is expressed as in China by toques or touches, 100 denoting purity. They are weighed by the Tical of 286 grs. troy. The new Tical is to be of the standard purity. Its intrinsic value is about 57 cents or from 29d to 30d; formerly its purity was from 11 oz. 4 dwts. to 11 oz. 12 dwts. fineness.

As already mentioned the small sea-shells, known as the *Cowry*, were formerly used as *Small-Currency*, and still are in some provinces of the Kingdom, generally 800 of them go to a *Fu'ang*. Owing to the total want of a governmental small coinage of suitable shape, they grew into great demand, which was further enhanced by the special requirement of the gambling class.

In the same way as opium, salt, and several other mercantile articles form Government monopolies, which are yearly given over to the highest bidders, so are the public lotteries and the establishing of *gambling houses* farmed out by the authorities.

The farmer of these houses divides the region over which he holds the monopoly, into districts, and subfarms these again to others. These sub-farmers, called "*Akuhns*," are mostly owners of one or two more houses specially adapted to their business, and are also entitled to sublet such houses or parts therein *ad libitum* for gambling purposes. Consequently gambling in Siam is confined to licensed houses, except when a general permission

to gamble is in force during the first three days of the Chinese and Siamese new year.

The method of gambling in Siam is the same as in China—Archdeacon S. H. Gray in his excellent and learned work “China” describes the gambling as follows:—

“Gaming houses are of various kinds. Those which are called *Tan-koon* are conducted by a joint-stock company, consisting either of ten or twenty partners. Such houses consist of two apartments. In the first of these is a high table, on the centre of which is placed a small square board. The four sides of the board are marked respectively one, two, three and four. For the game played in this apartment the presence of three of the partners is necessary. The first is called *Tan-koon* or the croupier; the second the *Tui-n’gan*, or shroff, who sits by the side of the former, with his tables, scales, and money drawers, to examine and weigh the money which may be staked; and the third, the *Ho-koon*, who stands by the table, keeps account of the game, and pays over the stakes to the rightful winners. The gamblers stand round the high table, and the *Tan-koon* or croupier, places a handful of cash on it before him. Over the heap he immediately places a tin cover, so that the gamblers cannot calculate the exact number of the cash. They are now called upon to place their stakes at any of the sides of the square board in the centre. When this has been done, the *Tan-koon* removes the cover, and using a thin ivory rod a foot long, proceeds to lessen his heap by drawing away four cash at a time. Should one cash remain, the gambler who placed his stake on the side of the small square board which is marked one, is declared the winner. If two cash remain, he saves his stake; and in the case of three remaining he is allowed the same privilege. If, however, four cash remain, he loses his stake. The game is called *Ching-tow*, and the gambler, as the reader will perceive, has one chance of winning, two of retaining his stake, and one of losing it.”

“A second game played at the same table is called *Nim*. At this game the gambler has one chance of winning double the amount of his stake; two chances of losing it, and one of retaining it. Should he place his stake on the side of the board marked two, and two cash remains, upon the *Tan-koon* removing his heap by four at a time, his winnings are double the amount of his stake. If three cash remain of the *Tan-koon*’s heap, the gambler retains his stake; if either one or four remain, he loses.

A third game played at this table is called *Fan*. In it the gambler has one chance of winning three times the amount of his stake, and three chances of losing it. A fourth game at this table is called *Kok*. The rule observed in it, is to place the stake at one of the corners of the board, that is, between any two of the numbers. Should the croupier's remainder correspond to either of the number between which the stake is placed, the gambler wins a sum equal to his stake. Should the remainder correspond to one of the other two numbers, he loses."

In Siam gambling is practised on a large scale; not only is it sanctioned by the authorities, but it actually forms a source of revenue to the Government.

As gambling became more and more a recognised institution the bullet-shaped small coins—*Salu'ng* and *Fu'ang*—were found inconvenient to handle; namely, the gambler squatting down on an oblong mat, at one end of which the cashier or croupier was seated in a kneeling attitude, the coin had often to be thrown to a considerable distance to reach the croupier, and it was very apt to roll off into a wrong direction. To remedy this inconvenience the owners of gambling establishments introduced special *Counters*, made of porcelain, glass, or lead, and representing various shapes, such as stars, cash, butterflies, door-tablets, etc., and on which were inscribed, in Chinese characters, the name of the Hong, the value, and some favorite motto or classical quotation, and also in Siamese characters, again, the value which the counter is suppose to represent. With very few exceptions these gambling houses are farmed by Chinese and the majority of the customers are of the same nationality.

Among the names of the gambling Hong's we find such as:—王合公司, 美利公司, 和順公司, 興隆公司, 如意公司, 順源, 和記, 永盛, 玉記, 和合, 通亨, 玉順, 王順, 宋源, etc. I need hardly remark that the Chinese above alluded to are from the Southern parts of China.

Examples of mottos are:—惠來, 其安, 順財, etc., of other inscriptions:—同治通寶, 萬利欽記 etc.

As designations of value there appear:—

For 1 *Salu'ng* 錢 or 錢, in Siamese 十

„ 1 *Fu'ang* 方 in Do. 寸

„ 1 *Songpei* 宋派

„ 1 *Pai* 一派

For 1 At 百文

„ 1 $\frac{1}{8}$  Songpei 二百文 or 公, in Siamese ๑๘

These counters being issued under authority granted in the gambling licence or concession, they rapidly became a favorite medium of exchange, and were found to fill a long felt want of small money so well, that the circulation went much beyond its legal sphere.

Such a facile field for foreigners was, however, not long to be left unexplored by the enterprising Celestials. Gradually a large quantity of imitations were thrown into circulation, and in self-defence, the gambling Hongks were compelled to call in and exchange for money their counters, which they continually substituted by new ones of varied colours and shapes.

In this way originated the great variety of counters consisting, as far as I can ascertain, of about 890 different kinds. The control by the Government became naturally more and more difficult, and at last in 1871, it became necessary to prohibit and stop completely all circulation of these counters. They are however still to be seen in some parts of the country.

Even since the counters made their first appearance—about in 1760—there existed in circulation some bronze coins of the value of 1 Salu'ng and of 1 Fu'ang. They were made by hand, and some of them are remarkable for the extremely artificial and tasteful formed workmanship displayed thereon. But the quantity issued was very limited and inadequate to the requirements.

During the reign of the 4th King of the present dynasty small coins were made of copper, bronze, and tin, representing a value of  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ,  $\frac{1}{16}$  and  $\frac{1}{32}$  Fu'ang. They were coined in the same manner as the second issue of the flat silver coins. The circulation of both the copper and bronze money was never very large, while the tin coins, issued considerably *below* their nominal value, were in consequence of the numerous forgeries soon put out of circulation. Chinese residing in Siam ordered of such coins from Hongkong, where they were manufactured on an extensive scale, and thence exported to Siam.

Hereupon, in substitution of the tin coin, a great improvement was introduced. Copper money was ordered to be minted in England, first issue of which came in circulation under the reign of the present King, in February, 1875.

It consisted of four different sizes :—viz 4, 2, 1, and  $\frac{1}{2}$  At.—



The obverse of the coin bears the Siamese Crown with the King's signature and the reverse in Siamese characters the value.



There is also to be mentioned here an issue of *paper money*, which, however, remained but a short time in circulation. Its value was one *At*.

To recapitulate:—During the first period, when AYUTHIA was the Capital of the Kingdom, there were only silver coins with the first mentioned stamps, while during the second period, with BANGKOK as Capital, the flat coin took the place of the bullet-shaped one, and after various trials, a small currency was successfully introduced.

## II. TRIBUTARY STATES OF SIAM.

Siam is bounded in the North by the many principalities of the Laos, all tributaries to Ava and China; on the East by Annam; on the West by the sea and by the British Possessions on the Malay Peninsula, and in the South by the small states of *Pahang* and *Perak*.

The Tributary States of Siam are:—1, in the South: the Kingdom of *Ligor*; 2, on the Malay Peninsula: *Tringano*, *Kalantan*, *Patani* and *Quedah*, 3, *Cambodja* and *Korat*, and 4., the principalities of Laos, viz., *Chieng-mai*, *Laphun*, *Lakhon*, *Muang-P're*, *Muang-Nan*, *Luang-p'ra-bang* and *Muang-long*.

The first, *Ligor*, called by the Siamese *Muang-Lakhon*, but the correct name of which is *Nakhon-si Thamarat*, is a Kingdom, founded by one of the Kings of *Ayuthia*, 450 years ago. It is situated between the parallels of latitude 7° and 9°, and is fifty leagues long and over thirty wide, *Thalung* and *Song-khla* are two provinces forming part of the Kingdom, and are governed by two princes, relations of the King of *Ligor*. The populations of *Ligor* may be estimated at 150,000 inhabitants, of which three

fourths are of the Siamese race, and the remaining portion is composed of Chinese, Malays, and aborigenes, which latter live in the forests.

### 1.—COINS OF LIGOR (LAKHON).

1.—*Fu'ang* of old origin, now only used as talisman, in the globular shape, bears only one stamp, which is, however, indistinct.

2.—Pewter *Pichi* (1256=1840/1) with the Arabian inscription: *Khalifa el mumenin* (Ruler of the believers), the Reverse bears also in Arabian: *Shehr Ligur derba* (?) sene **1184** (City of Ligor, in the year 1256 ?)—28½ mlm.—on both sides it has a walled border and a hole.

3.—Pewter Cash of which about 40 are equal to \$1,—of the former Governor,—the Obverse bears: 六崑通寶, the Reverse; 源利公司,—40 mlm.—both sides have a walled border and a hole.

4.—Pewter Cash, of which about 40 equal to \$1— of the present Governor; the Obverse same as above, the Reverse: 廣利合其—40 mlm.—both sides have a walled border and a hole.

### *Song-khla* (Singgora, Sangura.)

Pewter Cash, of which 400 are equal to \$1—½ *Fu'ang*—bears a Chinese inscription: 振興通寶, coin of the epoch *Chen-hsing*.—Its Reverse bears in Arabian, above: *Nagri* (Kingdom), below: *Sangura*, and in Siamese 4/3, *Song-khla*,—39-41mlm; it has a round hole and a walled border and hole.



### 2.—THE OTHER STATES OF THE MALAY PENINSULA.

Before the Portuguese took possession of Malacca the sovereignty of Siam extended over the whole Malay Peninsula, as

far as Singapore. The states of Johore, Pahang and Perak, were subsequently severed from the dominions of the legitimate sovereign, and placed under British Protectorate, so that the Kingdom of Siam, properly speaking, only begins from *Tringano* — being situated between the parallels of  $4^{\circ}$  and  $22^{\circ}$  of north latitude.

These provinces are administered by native governors, who are nominated by the King of Siam, and who hold the power to coin small money and to fix its value within their respective province over which they rule. This prerogative is exercised by all provincial administrators of *Tringano*. But further south the chief currency is the copper coin of the Straits Settlements. On the West coast, whereas formerly the governors issued their own money, we find at the present day Indian money (Rupees, Anas) circulating freely. The currency differs in every province and its denomination is fixed by the prerogative of the Governor. The larger coins found on the Eastern part of the Peninsula are the Mexican Dollars and the Dutch  $2\frac{1}{2}$  Guilders-pieces, which both pass at the same value. In the interior of the province of *Kalantan* the only means of effecting payment is in gold-dust.


The state of *Tringano*, situated in latitude 14 North, is a mountainous, but fertile country, wherein vast forests abound. Its population is placed at about 50,000, not including 10 or 12,000 Chinese. The river beds are said to be rich in gold and tin, which is mostly exploited by the Malays in the most primitive way, but the yield is sufficient to make it an important article of commerce in the country.

The city of *Tringano*, the residence of the Rajah, consists of some 1,500 houses, including Chinese quarters, is situated at the mouth of a small river, and an unpretending fort commands the approaches to it from a neighbouring hill.

#### Coins :

1.—Silver— $\frac{1}{4}$  Real—bears an Arabian inscription : *Soltha*—the Reverse is also inscribed in Arabian : *Adil* (Shah)—13 mlm. both sides bear a dotted circle.

2.—Pewter—*Pichi*—has an Arabian inscription : *Melik /el adil/...../* (the just king) 24 mlm.

3.—Copper—*Kepeng* ( $1/400$  Peso,  $1251 = 1835/6$ ).—Arabian : *Nagri /Tringganu/* ; the reverse bears also Arabian inscription : */Satu Kepeng/*  (I/one *Kepeng*/1251) 21 mlm.

The state of *Kalantan* is situated in the north-east of *Tringano*, from which it is separated by the small river *Batut*, and extends to another river called *Banara* on the confines of *Pa-ta-ni*.

The population, including the Chinese, consists of 65,000 souls. The country is divided into fifty districts.

Pewter Cash of which there are 980 to \$1 bears an Arabian inscription which, however, is so effaced as to render its deciphering on all the specimens in my collection, next to impossible—25 mlm., has a round hole, and a walled border.

*Thani* or *Patani*, situated to the North-west of *Kalantan*, is a rich and flourishing state, more fertile, has had more intercourse with the outside world than any other Malay state. It is celebrated in the annals of ancient navigators for having been the emporium of commerce between Siam, Cambodjia, and China. The population is computed to 100,000 souls, principally Siamese, and the country is divided into five provinces.

Under this heading there is, as far as my knowledge goes, only one coin, viz.

Pewter-*Pichi* (1261 = 1845) with Arabian inscription: *Ajin Pitis Belancha Rach Patani* (this is a current *Pitis* of the Racha of *Patani*.)—Reverse also in Arab. *Khalifa el-mumenin sene* ١٢٦١ (of the ruler of believers, year 1261)—30 mlm—with a round hole.

*Quedah*, which the Siamese call *Muang-Sai*, lies between the parallels of latitudes 5 and 7. A high range of mountains of a granite formation, varying in height from 4,000 to 6,000 feet, and said to be rich in tin, separates it from *Songkhla* and *Patani*. Gold is also found here but in small quantities.—The country is irrigated by thirty rivers of which six are navigable, and, it is divided into 105 districts containing a population of some 60,000 souls, chiefly Malays.

Sultan: *Mohammed Chiwa Zeinal Aladin Ma Alem Shah.*  
(1192  
1778 A.D.)

Silver Real—1154 = 1741/2—Arabian inscription; Face: *Solthan Mohammed* (محمد) *Chiwa* (?) *Khalifa er-nahmen* (Sultan Mohammed Chiwa, representative of Clemency). Reverse: *Bibelad Qedah* [dar el man] sene ١١٥٤ (in the country of Kedah, the sit of peace, year 1154) 21 mlm.

Sultan: *Tach ed-din Alem Shah.*  
(1219-1237 H.  
1804-1821 A.D.)

(last Malay ruler, was dethroned by the Siamese in 1821, and his kingdom incorporated to Siam, himself died 1846.)

Pewter *Trah*. Arabian inscription; Obverse: *Belad Kedah dar al-man* (country of Kedah, the seat of peace)—Reverse:



*Takin alif* **KYN** year, (of the cycle, Alif, 1224); 22½ mlm. round hole.

*Tuanku Anum*, Malay Governor of the Siamese.

Pewter *Trah*. Arabian inscription : *Belad Kedah (dar) el-man* (country of Kedah, the seat of peace)—Reverse : large six-rayed star ; 22 mlm ; round hole.

Pewter *Trah*. Arabian inscription : *Belandshah belad kedah dar el-man* (current in the country of *Kedah*, the seat of peace.)—Reverse : large 12 rayed star ; 18 mlm ; round hole.

Pewter *Trah* (1262-1846). Arabian inscription : *Belandshah belad el-Perlis Kedah sene* **١٢٦٢** (current, [in the capital] *Perlis*, of the Kingdom of *Kedah*, year 1262.)—Reverse : Lotus flower ; 24 mlm, round hole.

Pewter *Timma*. Cock standing on two rings. 43 mlm.

### 3.—SIAMESE CAMBODJIA.

*Cambodjia*, anciently known as *Kamphuxa*, whence it derived the name of *Cambodjia*, is now called *Khmer*.

Not later than 300 years ago this was a great kingdom, as compared with its present condition, then extending from 8° 30' to 20° N. lat. Its dominions comprised a great portion of the territory now forming part of Laos and even Siam.

Harassed on all sides, by Siam and Cochinchina, *Cambodjia* gradually lost one province after the other, and with them vanished her grandeur and splendour. The kingdom now embraces but few provinces which cover an area of only some 40 leagues, viz., *Photisat* or *Poursat*, *Kampong-suai*, *Kampong-som*, and *Kanpot* ; the last two of which border on the sea.


*Korat*, a small state, was in olden times but a city serving as boundary between Siam and *Cambodjia*, whence it became the name of *Nakon-raha-sema* (frontier city.)

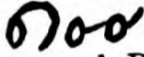
From the province of *Battambang* (13° N. Lat., North of *Photisat*) we possess an oval shaped copper coin, of small size, covered with a poor silver coating ; the face shows a cock stepping to the right, and over it the Chinese character 固 [or 固, to strengthen] ; the reverse is blank ; 15 mlm.—1,15 gr.—Value : 64 to 1 Tical.

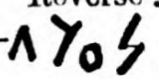
In the Northern provinces there is the *Tical*, being the largest coin in circulation, while in the Southern provinces extensive payments are effected in silver bars which bear a stamp as proof of having been examined and of the touch ;—and brass bars in the value of 2 *At* take the place of small money.

Other Cambodian coins are :—

1.—Silver *Fu'ang*—cock stepping to the right, 13-16 mlm, 23, 70 gr.

2.—Copper *At* , below cock turned to the right, 14 mlm.

3.—Pewter—Pagoda with one tower ; Cambodian inscription in two lines ; Reverse : on branches  (100) 20 mlm.

4.—Silver *Tical* (1208=1846) 3-towered Pagoda with Cambodian inscription in 3 lines. Reverse : Cambodian inscription ; cock turned to the right— (1208) —35½ mlm. 14, 70 gr.

5.—Pewter (Ounce=3 Tical, 1208=1846) 5-towered Pagoda with Cambodian inscription in 3 lines.—Reverse : cock turned to the right, inscription, at its feet (1208),—35½ mlm. 14, 70 gr.



6.—Silver *Tical* (1208=1846) 3 towered Pagoda with Cambodian inscription in 3 lines. Reverse : cock turned to the right, inscription, and (1208)—30 mlm. 15 gr.

7.—Silver  $\frac{1}{4}$  *Tical* (1208=1846) Pagoda with 1 tower. Reverse : Cambodian inscription in 3 lines, cock turned to the right and (1208)—20 mlm. 3, 60 gr.

8.—Pewter  $\frac{1}{4}$  *Tical* (1208=1846) Pagoda with 1 tower. Reverse : Cambodian inscription in 3 lines, cock turned to the right and (1208)—20½ mlm.

I shall not treat here the 22 different coins of Cambodia issued since her protection under France.

#### 4.—THE LAOS STATES.

The city of *Chieng-mai* lies in a fertile and picturesque plain to the east of a lofty mountain. In the annals of Siam we can

trace its age back to the fifth century of the Christian era. At the time of *P'ra-Ruang*, the king of Siam married a Princess of *Chieng-mai* to his brother, whom he then placed as ruler over that country.

*Laphun* is a petty state, governed by a prince of its own and stands under the vassalage of its neighbour, the ruler of *Chieng-mai*.

*Lakhon*—not to be confounded with the kingdom of *Lakhon* (*Ligor*)—a city of about 25,000 inhabitants, is situated in a rich and fertile plain, through which flows a great river.

*Muang-P're*.—The capital of this small kingdom is described as being situated in a well cultivated, small valley between two chains of mountains; a river which below the capital precipitates its waters in many cascades over a rocky bed, provides for ample irrigation. The population of this city does not exceed 15,000.

The kingdom of *Nan*, both as regards population and size, ranks above the three foregoing states, its capital alone containing at least 60,000 inhabitants. This country is bounded on the north by the territory of the *Laos* tribe called the *Lu*.

*Luang-P'ra-Bang*.—Not very long ago there flourished along Cambodjia's largest river, the *Mekong*, three *Laos* kingdoms, viz., *Yen-shan*, in the south, *Muang-P'uen* in the north, and between these two *Luang-P'ra-Bang*. The Siamese after completely devastating it annexed the first to their kingdom, and carried into captivity the greatest part of the population of *Muang-P'uen*. But *Luang-P'ra-Bang* was considerably extended to the north and gradually grew to what it is to-day a flourishing country, having an extensive commerce with the Siamese, the *Lolos* and the Chinese. The population of the capital is estimated at about 60,000 souls.

*Muang-Long*.—A month's journeying down a river which flows into the Menam in Ayuthia, that petty state, called *Muang-Long*, is reached. It is completely incased in a system of mountains and has a capital of scarcely more than 9,000 to 10,000 inhabitants.

In the South of the *Laos* States the ordinary Siamese money is in circulation, in the north, however, that of British India (*Rupees*, *Anas* etc.), whilst at the frontier of Burmah we meet also with coins of that country. In all the *Loas* States, besides, the so-called "*Sapeques*," the tin cash of Anam and Cochin-china, serves as a medium of exchange.

For numismatians these States are of a certain interest on account of the particular coin with which the *finer* are paid. This is in the shape of a shell, made of silver alloy. Each one of these coins bears three stamps, viz., two of the maker, the third in Laos-letters is the name of the temple, nearest to which the mint issuing the coin is situated.—Each piece, which according to law must contain a Rupee in silver, is issued at the value of three Rupees, and is paid—as above stated—only for certain purposes, such as fines, court-fees, and tributes to temples. In cases of smaller fines, as those of breach of discipline, the peasant pays 6, the lower official 12, the higher 24, and a chieftain 33 pieces. The benefit accruing to the Government from these peculiar coins amounts to the difference between the contents of silver to the value at which they are issued.

Older silver coins of the Laos are in the shape of bars, lobsters, and two clumsy horse-shoes joined together, with stamps in *Pali*, not yet deciphered.

Not to be omitted here are *Medals* lately coined, of which there are six, viz.

1.—A gold medal in memory of the sixtieth birthday of the late (4th) King—weight 4 Ticals ;

2.—the same medal in silver ;

3.—A large silver medal, coined in memory of the coronation of the present King,—weight 8 Ticals ;

4.—Copper medal in commemoration of the same event ;

5.—Copper medals coined on the 17th birthday of the present King ;

6.—A large silver medal in memory to the festival of the inauguration of the royal palace at Bang-paling,—weight 8 Ticals.

Although coined in France, but issued in commemoration of an event in Siam's history, the following medal is the most interesting.

The medal is of copper ; the Obverse bears : LUDOVICUS. MAGNUS. REX. CHRISTIANISS. with King Louis XIV.'s profile looking towards the right, clothed in Roman toga (below an R.—On the reverse we read : FAMA. VIRTUTIS. and see the Siamese Ambassadors before the King sitting on his Throne) and below the inscription : ORATORES. REGIS. SIAM. [M.D.C. LXXXVI.] MAUGER. F.



The history of this Siamese Mission is briefly as follows:—

Under the reign of King *Sômdetch P'ra Narai* (1657-1688) Constantin Falcon through the favour of his sovereign rose to the office of Prime Minister of the Kingdom. Upon his instigation the king sent an embassy to France, which were, however, shipwrecked near the Cape of Good Hope. Meanwhile, by the exertions of Falcon, trade with the outer world flourished more and more in Siam. The Dutch, French, English, and Portuguese had their commercial factories there. Falcon persuaded the king to send another embassy to France. His Majesty appointed *Nai Pahn* as first Ambassador, and two others, one as 2nd and the other as 3d Ambassador. This embassy reached happily its destination. King Louis XIV. gave audience to the Ambassadors on several occasions and was offered the cession of *Sangora* in consideration of his sending a small army of French soldiers to Siam.—In memory to their visit to France, and more especially to the first audience obtained from the King the above medal was coined, but in a very limited number. Two of these medals are kept in the *Musé du Louvre*; the hereto annexed impression I was fortunate enough to obtain from the original one, now preserved at Bangkok; it has a radius of 73 Millimeter and 172 grammes of weight; a small one had a radius of 41 Millimeter





Although the description of Siamese coins given in this essay has been well considered and is based upon most careful enquiries, it lays, as little as the author himself, no claim to infallibility—nor must it be considered as perfectly complete.—All I hope is that the notes above given may prove a useful guide and lead to further knowledge, and may they assist future collectors in entering upon profounder researches of the numismatics of that most interesting part of the Far East.

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854

JOURNAL  
OF THE  
NORTH-CHINA BRANCH  
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ROYAL ASIATIC SOCIETY.  
1880.

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# CONTENTS.

—:0:—

	PAGES.
Report of the Council for the year 1880 ... ..	i
List of Members... ..	iv
Treasurer's Report ... ..	viii
Librarian's Report ... ..	xii
Report of the Curator of the Shanghai Museum for the year 1880... ..	xxii
ARTICLE I.—Early European Researches into the Flora of China, by E. BREITSCHNEIDER, M.D. ... ..	1
ARTICLE II.—Coins of the present Dynasty of China, by S. W. BUSHELL, M.D. ... ..	195
ARTICLE III.—The "Naturalistic" Philosophy of China, by FREDERIC H. BALFOUR. ... ..	311





REPORT  
OF THE  
COUNCIL OF THE NORTH-CHINA BRANCH  
OF THE  
*Royal Asiatic Society,*  
FOR THE YEAR 1880.

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AT the Annual Meeting, held on the 8th of March, 1880, the following gentlemen were elected Office Bearers for the year:—

Very REV. DEAN BUTCHER, D.D., *President.*

A. J. LITTLE, ESQ., }  
A. E. HIPPISEY, ESQ., } *Vice-Presidents.*

CHAS. D. WHITTY, ESQ., *Secretary.*

MAX SLEVOGT, ESQ., *Treasurer.*

JOSEPH HAAS, ESQ., *Librarian.*

D. C. JANSEN, ESQ., *Curator.*

JOHN FRYER, ESQ.,

T. W. KINGSMILL, ESQ.,

D. J. MACGOWAN, ESQ., M.D., } *Councilors.*

J. RHEIN, ESQ.,

C. SCHMIDT, ESQ.,

A. B. STRIPLING, ESQ.,

Early in the year, the Very Rev. Dean Butcher, President, left Shanghai, and the Council have since been indebted to Mr. A. E. Hippisey, Vice-President, who presided in his place. Five meetings have been held during the year, and the following papers have been read:—

- 1.—27th January, "On Siamese Coinage,"—by Joseph Haas, Esq.\*
- 2.—8th March, "Remarks on the Middle Yangtsze,"—by D. J. Macgowan, Esq., M.D.
- 3.—7th June, "Coins of the present Dynasty of China,"—by S. W. Bushell, Esq., M.D., Physician to H. B. M. Legation, Peking.
- 4.—21st September, "On the Naturalistic Philosophy of China,"—by Frederic H. Balfour, Esq., Professor of English at the Imperial Japanese Legation, Peking.
- 5.—"On the Geology of Takow, Formosa,"
- 6.—"On the Geology of the Pescadores,"
- 7.—"On the Hydrology of the Yangtsze, the Yellow River, and the Peiho,"—by H. B. Guppy, Esq., M.B., Surgeon to H. M. S. *Hornet*.
- 8.—19th November, "Early European Researches into the Flora of China,"—by E. Bretschneider, Esq., M.D., Imperial Russian Legation, Peking.

Baron Ferdinand von Richthofen and Colonel N. Prejevalsky have been elected Honorary Members of the Society, in recognition of the eminent services rendered by them to the geography of Central Asia and China. Count Bela Széchenyi, the head of the Austro-Hungarian Expedition to Western China, and Mr. Herbert A. Giles, of H.B.M. Consular Service, have been nominated Corresponding Members.

The death of the Rev. S. R. Brown, D.D., formerly a resident of Yokohama, has deprived the Society of an old and distinguished Corresponding Member, and the Council also regret to record the death of three ordinary members, one of whom, Mr. G. G. Lowder, for some time acted as Hon. Secretary to the Society. Five members have resigned during the year, and eleven new members have been elected; the following shows the numerical strength of the Society at the end of the year:—Honorary Members, 16; Corresponding do., 23; Resident do., 38; Non-Resident do., 73. Total, 150.

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\* Published in the Society's Journal, Vol. XIV. 1879.

These figures go far to prove that the object of the Society and the benefits it offers to all cultured and thoughtful men are not sufficiently recognised by our resident community. It is true that during the year under review the meetings of the Society have been far better attended than during preceding years, but to be really prosperous we need the support of a wider circle of friends than are now found on the list of resident members.

Under the superintendence of Mr. Haas, the Honorary Librarian, the collection of books forming the Society's Library has been transferred to the present Lecture-hall, the circulation of the books being now under the control of the Committee of the Shanghai Library, and it speaks well for the new arrangement that the collection is now more generally used than has been the case formerly.

A new catalogue of the Library has been issued, and the Society's Journal for 1880 is in course of publication, under the editorship of Messrs. Hippisley and Haas.

The usual reports of the Librarian, Treasurer, and Curator of the Museum are appended.

31st December, 1880.



# LIST OF MEMBERS.

(JULY 1881.)

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## HONORARY.

—:O:—

His Majesty LEOPOLD II., King of the Belgians.

Alcock, Sir Rutherford, K.C.B., London.  
Hart, Robert, Esq., C.M.G., Peking.  
Legge, Rev. J., D.D., L.L.D., Oxford.  
Medhurst, Sir Walter H., K.C.B., London.  
Parkes, Sir Harry S., K.C.B., Tokio.  
Pereira, Marquis, A. F., Esq., Bombay.  
Prejevalsky, Col. N., St. Petersburg.  
Richthofen, Baron Ferdinand von, Bonn.  
Seward, George F., Esq., U.S.  
Shadwell, Admiral Sir Charles F.A., K.C.B., Melksham, Wilts.  
Wade, Sir Thomas F., K.C.B., Peking.  
Williams, Rev. S. Wells, L.L.D., Yale, U.S.  
Wylie, Alex, Esq., London.  
Yule, Col. H., C.B., London.

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—:O:—

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Cox, Rev. Josiah,——.  
Delaplace, Mgr. L. G., Peking.  
Edkins, Rev. J., D.D., Peking.  
Fritsche, H., Esq., Ph. D., Peking.  
Fryer, John, Esq.  
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Gordon, Col. C. G., England.

Hance, H. F., Esq., Ph. D., Whampoa.  
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 John, Rev. Griffith, Hankow.  
 Keischke, Dr. Ito, Tokio.  
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 Lindau, Rudolph, Esq., Berlin.  
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 Martin, Rev. W. A. P., D.D., L.L.D., Peking.  
 McCartee, D. B., Esq., M.D., Tokio.  
 McClatchie, Rev. Thos., M.A., Shanghai.  
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 Muirhead, Rev. W., Shanghai.  
 Schereschewsky, Right Rev. S. I. J., D.D.  
 Széchényi, Count Bela, Zinkendorf, Hungary.  
 Williamson, Rev. A., L.L.D., Chefoo.

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Wicking, H., Esq., Hongkong.  
Wilcox, R. C., Esq., Hongkong.

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## TREASURER'S REPORT.

—:O:—

*To the President and Council of*

THE NORTH-CHINA BRANCH OF THE ROYAL ASIATIC SOCIETY,  
SHANGHAI.

GENTLEMEN,

IN submitting to you the Accounts of the North-China Branch of the Royal Asiatic Society for the year 1880, I have much pleasure in being able to report favorably on the financial position of the Society. From the enclosed Balance Sheet it will be seen that the total income of the Society during 1880 amounted to Mex. \$. 864.13, the current expenses to Mex. \$. 455.32, leaving a Credit Balance of Mex. \$. 408.81 in the hands of your Treasurer. During the year 98 Subscriptions, producing Mex. \$. 710, have been collected, as against Mex. \$. 645 received in 1879. 28 Subscriptions are still due from Non-Resident Members, but I do not anticipate that these arrears will bring in more than about Mex. \$. 80. An amount of Mex. \$. 136.90 has likewise been received for copies of Journals sold by Messrs. Trübner & Co., London, and it is hoped that the arrangement recently concluded with our local Agents will help to increase the Society's income from this source.

The reduced cost of the Journal for 1879 is the principal cause of last year's disbursements contrasting favorably with the expenditure of former years; on the other hand our expenses for Fire-Insurance, repairs to the building, advertisements and book-binding have been somewhat heavier than usual. The Society have no outstanding liabilities at present but early in the year about Mex. \$. 90 will become due for printing the new Catalogue of the Library and the cost of the Journal for 1880 will form a very conspicuous item in the expenditure of the current year.

As regards the Museum, its existence is dependent upon the liberal contributions received from the English and French Municipal Councils, and it is to be hoped that our two Municipalities will continue to assist an Institution so deserving of support and which is a source of pleasure and instruction to a large part of our community. During the year the receipts of the Museum amounted to Mex. \$. 851.37, the expenditure to Mex. \$. 709.24, of which Mex. \$. 102.46 properly belong to the previous year, being amount of rent due to the Shanghai Library for the 6 Months ending 31st December, 1879. A Credit Balance is thus shown amounting to Mex. \$. 142.13 = Tls. 103.09, which are duly lodged with the Hongkong and Shanghai Banking Corporation. In the matter of outstanding liabilities the Museum is less fortunately situated than the parent Institution, its indebtedness on 31st December, 1880 being as follows:—

To Recreation Fund: Interest on Loan of	Tls. 1500,	
three years at 5 per cent per annum, ...	Tls. 225.	
To W. B. Pryer, Esq., Sundry Expenses for Museum,		
due since 1875, \$.51.39, ... ..	Tls. 37.37	
		<u>Tls. 262.37</u>

MAX SLEVOGT,  
*Hon. Treasurer.*

SHANGHAI, 1st February, 1881.

**BALANCE SHEET**  
**OF THE**  
**NORTH-CHINA BRANCH OF THE ROYAL ASIATIC SOCIETY,**  
**FOR THE YEAR 1880.**

RECEIPTS.		DISBURSEMENTS.	
To 14 Subscriptions collected for 1879.		By Amount paid to Hon. Treasurer	
" 84 do. 1880.		for 1879 .. ..	
" Sale of Journals:		Printing Journal for 1879. ...	
Trübner & Co., London: £25.8/4.		Wood-cuts for do. do. ...	
Lane, Crawford & Co.:		Fire-Insurance:	
Museum Fund: Balance of Loan.		Tls. 3000. on Building = Tls. 24.	
Tls. 150. = \$205.20		" 2500. " Contents do. =, 20.	
		" 1600. " Journals =, 12.80	
		Stationery, Book-binding & Printing	
		Advertisements. ...	
		Repairs to Building. Tls. 25.	
		Municipal and Chinese Govern-	
		ment Taxes ...	
		Postages and Freight on Journals	
		Gas and Coal ...	
		Wages to Shroff, Coolyhire and	
		sundry Expenses ...	
		Balance in hand ...	
Total...		Total...	

E. & O. E.

**MAX SLEVOGT,**  
*Hon. Treasurer.*

SHANGHAI, 31st December, 1880.

*Audited and found correct,*  
JOS. HAAS  
G. KLEINWACHTER.



**BALANCE SHEET**  
**OF THE**  
**MUSEUM FUND OF THE NORTH-CHINA BRANCH OF THE**  
**ROYAL ASIATIC SOCIETY,**  
**FOR THE YEAR 1880.**

RECEIPTS.		DISBURSEMENTS.	
To	Grant of	By	Rent of Museum for 6 Months ending 31st Decbr., 1879, Tls. 500.
Grant of	English Council, ... ..	102	46
Grant of	French Council, ... ..	204	99
Sale of	Duplicates from Museum	307	45
Interest on	Current Account with H. & S. Bank, ... ..	240	97
Wages to	Chinese Taxidermist, 12 Months at \$20 p.m.	60	81
Repairs to	Building	33	53
Fire-Insurance	on Contents of Museum: Tls. 1000.=Tls. 8.	10	53
Municipal Taxes	...	4	95
N.-C. B. of the	R.A. Society: Balance of Loan Tls. 150.= \$205.20.	15	13
Incidental Expenses	...	36	37
Balance deposited with	Hong-kong and Shanghai Banking Corporation, Tls. 103.09.	142	
Total...	...	\$ 851	\$ 851

SHANGHAI, 31st December, 1880.

**Audited and found correct.**  
**JOS. HAAS**  
**G. KLEINWACHTER.**

E. & O. E.

**MAX SLEVOGT,**  
*Hon. Treasurer.*

## LIBRARIAN'S REPORT.

—:o:—

THE most important event of the year, as regards the Library, has been the transfer of its collection of books to the custody of the Committee of the Shanghai Library, the latter Institution undertaking to superintend the circulation of the books in consideration of the members of the Shanghai Library being allowed the free use of the Society's Library. Although this arrangement may at first sight appear to be one-sided, it is really in favour of the Society, as from want of a Librarian residing on the premises, the collection of books has been practically inaccessible in the past. If in future the number of readers should not increase, it will be due to lack of interest rather than owing to defects in the management of the Library.

To facilitate the supervision of the books, the collection has been removed to the Lecture-hall on the ground-floor of the Society's building and the Library itself has been put into better order.

In accordance with the terms of the agreement entered into with the Shanghai Library a hand-list of works contained in the Society's collection has been prepared, corrected up to 31st December 1880, and the same shows 991 Nos. to which must be added the 1023 Chinese volumes of the Wylie Library and the collections of works on Natural History which remain under the charge of the Museum authorities.

As will be seen from the annexed list of additions received at the Library during the past year, the Society has again not been able to acquire any works by purchase, which is to be regretted, as the collection, although rich in early works on China and the Far East, shows some important *lacunae* as regards publications of a more modern date. The names of Ritter, Lassen,, Yule, Koeppen, Beal, Palladius and Prejevalsky will be looked for in vain on the pages of our Catalogue, not to mention numerous other works which are indispensable to every scientific Library in the East.

On the other hand the accessions to the Library, received in the way of exchanges or as donations from Governments, Publishers and private individuals, have been neither few nor unimportant, as a glance at the appended list will show.

Foremost in rank, both as regards the donor and the value of the donation, stands the magnificent work on Boro-Boudour, presented to the Society by H. E. the Netherlands' Minister for the Colonies, the full title of which is as follows :—

Buddhist Architectural Remains in Java :

“BORO-BOUDOUR,” dans l’Ile de Java, dessiné par F. C. Wilsen, avec texte explicatif et descriptif, rédigé d’après les mémoires M. S. S. et imprimés de F. C. Wilsen, J. F. G. Brumund et autres documents, publiés par C. Leemans.—

2 vols. 8vo of text (French and Dutch), with 17 plates and 8 royal folio volumes of 393 large plates, containing about 1000 separate designs.—Leide, 1874.

Bernard Quaritch says in relation to this work (Book List No. 47) :

“This grand work, published by order of the Dutch Colonial Office, illustrates the ruins of an ancient temple first discovered in 1814, which forms a splendid monument of Buddhist architecture in Java in the eighth or ninth century of our era. It attests the magnificent civilisation of the ancient Indo-Javanese dynasties that ruled the island before the arrival of Mahomedan conquerors, and adds an important contribution to the history of Buddhism and its developments in Art. The sculptures are treated in detail in the text, so that the latter has grown into an extensive work on the historical and traditional life of Buddha, the ancient history of India, and the history of Java during the sixth to the fourteenth century.”

The number of Scientific Institutions with whom the Society exchanges publications has been further extended during the year, and the list now comprises some 30 Societies in Europe, America and Asia.

To Dr. E. Behm, the Editor of Dr. A. Petermann's *Geographische Mittheilungen*, Guido Cora, the well-known Italian Geographer, Dr. Sourindro Mohun Tagore of Calcutta, who presented the Society with 26 of his works on Hindu Poetry and Music, to the Inspector General of the Imp. Chinese Maritime Customs, to the Rev. Father M. Dechevrens, S. J., the learned Director of the Zi-Ka-Wei observatory, and to several other valued authors, whose names will be found in the annexed list, the Library is indebted for many important contributions, and while it is hoped that the interest thus shown in the welfare of the Society will be maintained, I trust that others will come forward and help us to fill up the blanks which at present somewhat detract from the value of the Library.

JOSEPH HAAS,  
*Hon. Librarian.*

SHANGHAI, *January*, 1881.

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**LIST OF WORKS PRESENTED TO THE LIBRARY OF THE NORTH-CHINA BRANCH OF THE ROYAL ASIATIC SOCIETY DURING THE YEAR ENDING 31st DECEMBER, 1880.**

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921. *Chinese Buddhism* by the Rev. Joseph Edkins. *London*, Trübner & Co., 1880, 8vo.  
from the Author.
925. *Harmonium Sutra*, or a Treatise on Harmonium by Sourindro Mohun Tagore. *Calcutta*, 1874, 8vo.
926. *Theory of Sanskrit Music*, compiled from the ancient authorities, by Sourindro Mohun Tagore. *Calcutta*, 1875, 8vo.
927. *Hindu Music* from various authors compiled by Sourindro Mohun Tagore. *Calcutta*, 1874, sm. 8vo.

928. *Yantra Kosha* or a Treasury of the Musical Instruments of ancient and modern India, by Sourindro Mohun Tagore. *Calcutta*, 1875, sm. 8vo.
929. Public Opinion and Official Communications about the Bengal Music School. *Calcutta*, 1876, 8vo.
930. *Six Principal Rāgas*, with a brief view of Hindu Music, by Sourindro Mohun Tagore. *Calcutta*, 1877, 4to.
931. Short Notices of Hindu Musical Instruments, by Sourindro Mohun Tagore. *Calcutta*, 1878, 8vo.
932. *Gitāvali*, or a Hindi Manual of Indian Vocal Music, by Sourindro Mohun Tagore. *Calcutta*, 1878, 8vo.
933. *Sangita Sāra*, or a Treatise on Hindu Music, by Kshetra Mohana Gosrami. *Calcutta*, 1879, 8vo.  
from Rajah Sourindro Mohun Tagore.
934. Occasional Papers on Chinese Philosophy, by Chaloner Alabaster.—No. VI. The Chinese Bible, ppto. 8vo.  
from the Author.
939. Report of the Commissioner of Agriculture for the year 1877. *Washington*, 1878, 8vo.  
from the U. S. Department of Agriculture.
941. Metaphysics or the Science of Perception, by John Miller. *New York*, *Dodd and Mead*, 8vo.  
from the Author.
944. Report of the Superintendent of the United States Survey for the fiscal year ending with June 1876. *Washington*, 1879, 4to. (2 copies).  
from the U. S. Department of Coast Survey.
945. United States Geographical Surveys West of 100th Meridian.—Part II. Astronomy and Barometric Hypsometry. *Washington*, 1877, 4to.  
from Lieut. Geo. M. Wheeler.
949. Bulletin Mensuel de l'Observatoire Magnétique et Météorologique de Zi-ka-wei. Tome V.—1879, 8vo.  
from the Rev. Jesuit Fathers.
951. The Cities and Towns of China, a geographical dictionary, by G. M. H. Playfair, *Hongkong*, 1879, 8vo.  
from the Author.
955. Os Lusíadas por Luis de Camões. Edicao Popular gratuita da Empreza do Diario de Noticias, 1880.  
from the Publishers.



956. *Victoria-Samrajyan*, or Sanskrit Stanzās in commemoration of the assumption by H. M. G. Maj. the Queen Victoria of the diadem "Indiæ Imperatrix", by Sourindro Mohun Tagore. *Calcutta*, 1877, 8vo.
957. *Victoria-Giti-Malā*, or a brief History of England in Bengali Verses, by Sourindro Mohun Tagore. *Calcutta*, 1877, 8vo.
958. A few Lyrics of Owen Meredith, set to Hindu music, by Sourindro Mohun Tagore. *Calcutta*, 1877, 8vo.
959. *Bhugola o Itahasa Ghatita Brittanta*.—Part I, Europe, by Sourindro Mohun Tagore. *Calcutta*, 1877, 16mo.
960. Fifty Tunes composed and set into music by Sourindro Mohun Tagore, 1878, 8vo.
961. A Vedic Hymn, published by Sourindro Mohun Tagore. *Calcutta*, 1878.
962. *Yantra Kshetra Dipikā*, or a Treatise on the "Setar", by Sourindro Mohun Tagore, Sec. Ed. *Calcutta*, 1879, 8vo.
963. A few Specimens of Indian Songs, by Sourindro Mohun Tagore. *Calcutta*, 1879, 8vo.
964. *Kari-Rahasyam*, or a Root-Lexicon within a Poem, by Bhatta Halāyudha. *Calcutta*, 1879, 8vo.
965. The ten principal *Avatāras* of the Hindus, by Sourindro Mohun Tagore. *Calcutta*, 1879, 8vo.
966. *Mānasa Pujanan*, a collection of Sanskrit Hymns, by Sankara Charjya. sm. 8vo.
967. *Mālabikagnimitra*, a drama in five acts by Kālidāsa. Sec. Ed. *Calcutta*, 1877, 16mo.
968. *Bhāritaya Nātya Rahasya*, or a Treatise on Hindu Drama, by Sourindro Mohun Tagore. *Calcutta*, 1878, 16mo.
969. The eight principal *Rasas* of the Hindus, by Sourindro Mohun Tagore. *Calcutta*, 1879, 4to.
970. *Venī Sanhara Nataka*, or the Binding of the Braid, a Sanskrit drama, by Bhatta-Narayāna. *Calcutta*, 1880, 8vo.
971. *Muktabali Natika*, a Bengali Drama, 12mo.  
from Rajah Sourindro Mohun Tagore.
972. A Voyage in the "Sunbeam", by Mrs. Brassey. *Leipzig*,  
*Bernhard Tauchnitz*, 1879, 12mo.

Presented.

974. *Reizen naar Nederlandsch Nieuw-Guinea in de Jaren 1871, 1872, 1875-76, door P. J. B. C. Robidé van der Aa. S'Gravenhage, Martinus Nijhoff, 1879, 8vo.*  
from the Author.
975. *Reisen in China von Peking zur Mongolischen Grenze und Rückkehr nach Europa, von Dr. Adolf Bastian. Jena, Costenoble, 1871, 8vo.*  
from Joseph Haas Esq.
976. *The Missionary Enterprise, its success in other lands, the assurance of its success in China, by a Missionary. Shanghai, 1880, ppt. 8vo, 23 pag.*  
from Presbyterian Mission Press.
978. *Bôro-Boedoer up het Eiland Java, door Dr. C. Leemans. Leiden, E. J. Brill, 1873, 8vo.*
979. *Bôro-Boudour dans l'île de Java, dessiné sous la direction de Mr. F. C. Wilsen avec texte descriptif et explicatif, redigé d'après les mémoires manuscrits et imprimés de M. M. F. C. Wilsen, J. F. G. Brumund et autres documents, et publié d'après les ordres de Son Excellence le Ministre des Colonies, par le Dr. C. Leemans. Leide, E. J. Brill, 1874, 8vo.*
980. *Bôro-Boudour sur l'île de Java. Leide, E. J. Brill, folio, 1<sup>e</sup>-8<sup>e</sup> Livraison.*  
from H. Exc. the Netherlands' Minister of Colonies.
987. *La Province Chinoise du Yûn-nan, par Emile Rocher. 2 vols. Paris, Ernest Leroux, 1879, 8vo.*  
from the Statistical Department Imp. Maritime Customs.
988. *Chinese Chronology and Cycles by Thomas Fergusson. Shanghai, 1880, 12mo.*  
from the Author.
989. *The Province of Shing-king (by Julius Bryner). Shanghai, 1880, 4o.*  
from the Author.
990. *A Brief Account of the Tagore Family. Calcutta, 1868, 8vo.*  
from the Author.
830. *Trübner's American and Oriental Literary Record. Nos. 145/6 (Vol. XII, Nos. 9-12); New Series, Vol. I, Nos. 1, 3-8.*  
from the Publishers.

991. *Bibliothèque de feu M. Jules Thonnellier, Orientaliste etc. Partie Orientale et Linguistique. Paris, Ernest Leroux, 1880, 8vo.*

from F. B. Forbes, Esq.

838. *Journal of the Royal Asiatic Society of Great Britain and Ireland. New Series: Vol. XI, Part III, August 1879; Vol. XII, Part I, January 1880, Part II, April 1880.*

from the Society.

839. *Journal of the Statistical Society of London. Vol. XLII, 1879, Part III, Sept.; Part IV, Dec.; Vol. XLIII, 1880, Part I, March.*

from the Society.

840. *Proceedings of the Royal Geographical Society and Monthly Record of Geography. Vol. I, 1879, No. 11, Nov.; No. 12, Dec.; Vol. II, 1880, Nos. 1-7, Jan.—July.—Title, Contents and Index for Proceedings 1879.*

from the Society.

841. *Proceedings of the Royal Society of Edinburgh. Session 1878-79, Vol. X. (2 copies).*

from the Society.

846. *Bulletin de la Société de Géographie. Dec. 1879; Janv.—Juin 1880.*

from the Society.

849. *Mémoires de la Société des Etudes Japonaises, Chinoises, Tartares et Indo-Chinoises.—Session de 1878-79.*

from the Society.

851. *Zeitschrift der Deutschen Morgenländischen Gesellschaft. XXXIII. Band (1879), III. & IV. Heft.*

from the Society.

852. *XVI. Jahresbericht des Vereins für Erdkunde zu Dresden. Wissenschaftlicher Theil.*

from the Society.

868. *Cosmos, Comunicazioni della Geografia di Guido Cora. Vol. V, 1878, Nos. X-XII; Vol. VI, 1880, Nos. I-IV.*

from the Editor.

870. *Monatsbericht der Kön. Preuss. Akademie der Wissenschaften zu Berlin. Sept.—Dec., 1879; Jan.—Juli, 1880.*

from the Academy.

871. *Sitzungsberichte der K. B. Akademie der Wissenschaften zu München.*

1. Philosophisch-philologisch and historische Classe: 1878, Band II, Heft I-III; 1879, Band III, Heft I-III.
2. Mathematisch-physikalische Classe: 1878, Heft IV; 1879, Heft I & II.

from the Academy.

872. Tijdschrift voor Indische Taal-, Land-, en Volkenkunde. 1879, Deel XXV, Aflevering 4-6; 1880, Deel XXVI, Afl. 1 & 2. Bijdragen: Derde Deel, 1. & 2. Stuk.
892. *Bataviaasch Genootschap von Kunsten en Wetenschappen*:  
2. Notulen, Deel XVII, 1879, Nos. 2-4; Deel XVIII, 1880, No. 1.  
3. Verhandelingen, Deel XXIX, 2<sup>e</sup> Stuk; Deel XLI, 1<sup>e</sup> Stuk.  
Register op de Notulen der Vergaderingen over de Jaren 1867-1878.

from the Society.

873. Oesterreichische Monatsschrift für den Orient: 1880, Februar-August.

from the *Oriental Museum in Vienna*.

874. Mittheilungen der Kais. u. Kön. Geographischen Gesellschaft in Wien. 1879, XXII Band.

from the Society.

879. Atti della R. Accademia dei Lincei in Roma. Transunti: 1879, Dec.; 1880, Gen.-Giugno.

from the Academy.

880. Journal of the *American Oriental Society*. Tenth Volume, No. II (2 copies).

from the Society.

881. *Smithsonian Institution*. Annual Report of the Board of Regents for the year 1877.

from the Institution.

885. *American Philosophical Society at Philadelphia*. Proceedings: Vol. XIV, Nos. 94 & 95, 1875; Vol. XVI, Nos. 99 & 100, 1877; Vol. XVII, Nos. 101 & 102, 1878. Catalogue of the Library, Part III, 1878.

from the Society.

899. Transactions of the *Asiatic Society of Japan*: Vol. VIII, Pt. I, Febr. 1880, Pt. II, May 1880, Pt. III, Oct. 1880.

from the Society.

917. Reports on Trade at the Treaty Ports in China for the year 1878.—14th Issue.

918. Returns of Trade at the Treaty Ports for the year 1879.  
Part II, Statistics of the Trade at each Port.
919. Imperial Maritime Customs.—Medical Reports for the  
half year ended 31st March 1880.—19th Issue.  
from the Statistical Department Imp. Maritime Customs.

NOT INCLUDED IN CATALOGUE, 1881.

Boletin del *Ministerio de Fomento de la Republica Mexicana* :  
Tom. IV, 116-157; Tom. V, 1-6, 18-170.

*Revista Cientifica Mexicana* : 1880, Tom. I, Num. 1-3.  
from the Government of Mexico.

Boletin de *La Sociedad de Ingenieros de Jalisco* : Sept. 15, 1880,  
Tom. I, No. 1.

from the Society.

*Zweiter Jahresbericht des Vereins für Erdkunde zu Metz pro 1879.*  
from the Society.

*Dr. A. Petermann's Mittheilungen aus Justus Perthes' Geogra-*  
*phischer Anstalt, herausgegeben von Dr. E. Behm.*  
26. Band, 1880, I-X; *Ergänzungsheft No. 12.*  
from the Publisher.

*Revue critique d'Histoire et de Littérature.* No. 19, 10th  
May 1880.

Thirty first annual Report of the Trustees of the *Astor Library*  
for the year ending December 31st, 1879.  
from the Library.

*Journal of the Society of Arts.* London. Vol. XXVIII, No. 1448.  
from the Society.

*Customs' Gazette*, No. XLVII, July-September 1880.  
Returns of Trade at the Treaty Ports in China for 1879 (in  
Chinese).

List of Chinese Light-houses, Light-vessels, Buoys and Beacons  
for 1879 (in Chinese).  
from the Statistical Department, Imp. Maritime Customs.

*Journal of the Straits Branch of the Royal Asiatic Society.*  
June 1880.

from the Society.

*Museum Library* :

The Natural History and Scientific Book Circular, by William  
Wesley, bookseller and publisher.  
from the Publisher.



*Bulletin of the Minnesota Academy of Natural Sciences for 1877.*  
from the Academy.

XXVI. und XXVII. Bericht des Vereins für Naturkunde zu  
Kassel über die Vereinsjahre vom 18. April 1878 bis  
dahin 1880.

from the Society.

Jahresbericht des Vereins für Naturwissenschaft zu Braunschweig  
für das Geschäftsjahr 1879-1880.

from the Society.

Annual Report of the Curator of the *Museum of Comparative  
Zoology* at Harvard College for 1878-1879.

from the Curator.

Proceedings of the Scientific Meetings of the *Zoological Society  
of London* for the year 1879. Parts III & IV.

List of the Vertebrated Animals in the Gardens of the *Zoological  
Society*. 1879, and first supplement.

from the Society.

The Quarterly Journal of the *Geological Society of London*. Vol.  
XXV, Pt. 4, No 140, Nov. 1879; Vol. XXVI, Pt.  
1 & 2, Nos. 141 & 142, Febr-May 1880.

List of the *Geological Society of London*. 1st Nov. 1879.

from the Society.

Jahrbuch der Kais. Kön. Geologischen Reichsanstalt in Wien.  
1878, XXVIII. Bd., No. 4, Oct.—Dec.; 1879, XXIX.  
Bd., No. 2, Apr.—Juni.

from the Institution.

Catalogue of Minerals by A. E. Foote, M.D. *Philadelphia*.

from the Author.

Notes on the Geology of the Iron and Copper Districts of  
Lake Superior by M. E. Wadsworth.

from Harvard College, U.S.A.



## SHANGHAI MUSEUM.

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### REPORT OF THE CURATOR FOR THE YEAR 1880.

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It will be gratifying to the members of the Society to learn that throughout the year, notwithstanding the absence of my scientific predecessor, the public has continued to exhibit its usual interest in the Museum. The book kept there shows that more than three hundred persons visited it during the year; but this, I must mention, very inadequately represents the total number who have done so, few indeed regarding the request of entering their names. The donations, which have been made during that period, more than equal, both in point of number and scientific interest, those of the preceding year. A detailed list of them is attached to this report, and I venture to suggest, that in the interest of the Society, it is desirable that this should be published *in extenso*, together with the contributors' names, in its Annual Report; so that an official recognition may be given which will probably be more generally esteemed than the simple announcement hitherto limited to the daily journals.

I think it only right to specially call the attention of the Society to the extensive and valuable collection of specimens illustrative of the geology of China presented to the Museum during the year, and for which we are indebted to Dr. H. B. Guppy, of H.B.M.'s ship *Hornet*. This forms by far the most complete series which has hitherto been received; and its intrinsic value is enhanced by the locality being attached to each specimen, and by the nomenclature being given in most cases, upon the authority of the contributor. If a transient visitor has been able to make so valuable a collection with such slight opportunities, how great a field is open to resident and corresponding members of the Society, either personally or through the medium of their friends at the out-ports, to largely aid in acquiring a knowledge of this neglected but most important branch of the scientific history of this immense empire.

Some highly interesting geological specimens from Corea and Russian Siberia have also been presented by Capt. G. C. Anderson, of the s.s. *Appin*, and we are indebted to the same gentleman for specimens of seaweed, shells, and other objects of scientific interest.

Many other gentlemen whose names appear in the list have given us assistance with regard to Ornithology, Entomology, &c., and in addition to the thanks which will I feel sure be cordially voted by the members to the various contributors, I would suggest that a special letter of acknowledgement be forwarded by the President to each of them, and that this course should be adopted in future, immediately on the receipt of any donation; and, also, that when possible, the conventional and scientific names of any specimen received should be specially included in the letter acknowledging it.

A great opportunity for expansion has been afforded us by the acquisition of another room placed at the disposal of the Museum by the removal of the Society's Library, consequent on its transfer to the custody of the Shanghai Library. We have, however, refrained from utilizing the extra space thus afforded us until our financial position for the coming year had been determined; considerable expenditure having become necessary for converting some of the old show cases and the purchase of new ones.

With the re-arrangement and enlargement which we are now in a position to commence, I think new spirit might be infused and a greater impetus given to the affairs of the Museum by the assumption of the functions of Curator by several members, in place of by one individual as heretofore; each taking that province with which he is most familiar, or in which he is most interested. Let, for example, Zoology and Botany be undertaken by one, Geology by another, and Technology by a third. By such an arrangement a kind of committee would be constituted, each member of which would be able to call upon his friends for assistance in procuring specimens and information relating to his particular department; which would, consequently, be benefitted by the closer and more competent attention he could devote to its interests, and that, too, without any great tax on his leisure.

I cannot too strongly urge upon your attention the value which a good Technological collection would possess, or the easy and inexpensive manner in which it might be acquired. Specimens of all the products of Chinese labour, whether in agriculture, arts, or manufactures, would form a most interest-

ing and suggestive collection; and I have no doubt that these could be procured through the medium of the several Consuls, and especially of the Custom House officials, in the different open ports; and that we might confidently rely—if proper application were made him—on the cordial co-operation of the Inspector-General of Customs, whose love of science and interest in the advancement of Chinese affairs would enlist his sympathies in our scheme. The formation of such a collection would impart new life to the institution and give interest and variety to its now somewhat monotonous exhibit, composed mostly of specimens of the Zoology of this province. The labour of arranging the specimens in cases would be but a small part of the work required in collecting each exhibit. The history, description, uses, and methods of preparation of its many interesting products should be gleaned—studious examination made—and the resulting information published for the public benefit. The collection would embrace the direct products of Chinese labour in their marketable state; that is, as they are produced and offered for sale by the farmer, artisan, or manufacturer. In arranging such a collection a classification should be adopted that is simple and at the same time comprehensive, and as we are limited both in means and space, it would be as well, perhaps, for us to confine ourselves to obtaining specimens for the three following simple divisions:—

1st.—All food substances.

2nd.—Substances used in the arts and manufactures.

3rd.—Natural History in relation to the production of the above.

For instance, in the 1st Dept. we might arrange cereals and legumes, fruits and vegetables, farinaceous substances, sugar, beverages, liquors, narcotics, spices, and condiments.

In the 2nd Dept. we could place all animal fibres, vegetable fibres, paper materials, dyes, colouring and painting materials, tanning materials, gums and resins, fats, oils and wax, medicines, etc.

The 3rd Dept. would embrace natural History in relation to or in any way connected with the production of the above, such as farm animals, animals found upon the farm in a wild state, animals denominated as “farm pests,” and those useful as furnishing food, or from their destroying insects, domestic poultry, game birds, hybrids. Birds—beneficial or injurious—insects injurious to vegetation, arranged in regard to the plants on

which they feed, together with artificial means of destruction, etc., etc.

I am aware that the utilitarian character of such a collection will strike some of the members of the Society as being foreign to the original design of the Museum. Still I venture to hope that before throwing the suggestion aside as useless or impracticable, it will receive due consideration from the officers and members. We receive Tls. 600 a year from the Ratepayers of the English and French Settlements of Shanghai under the idea of the Museum being a public benefit. But the accumulated contributions of the few years it has been in existence are nearly all so purely scientific that, while presenting points of interest to a few lovers of science, they possess but little else to recommend them to the general public. The Technological department suggested would, however, be of a more practical turn, and while but slightly interfering with the present routine of the institution would, I feel sure, be a benefit to the public at large; and while interesting to all, an honorable addition to our little Museum.

D. C. JANSEN,  
*Hon. Curator.*

SHANGHAI, 10th March, 1881.





# LIST OF CONTRIBUTIONS RECEIVED AT THE SHANGHAI MUSEUM DURING THE YEARS 1879 AND 1880.

DATE.	NO.	CONVENTIONAL NAME.	SCIENTIFIC NAME.	WHERE FOUND.	NAME OF CONTRIBUTOR.
1879.					
May 1		Ephemera	Ephemera	Shanghai	A. Warrick.
" 9		Bittern	Botaurus stellaris	-	T. Howell.
		Japanese Ibis 1 pair	Ibis nippon	-	
		Chinese Jay	Garrulus sinensis	-	
		Himalayan Magpie	Dendrocitta hima- layana.	-	T. M. Young.
		Smew	Mergus albellus.	-	
17		Cinnamon Heron	Ardetta cinnamomea	-	G. C. Anderson s.s. "Apin"
		Grey Sandpiper	Totanus incanus	-	do.
		Whimbrel	Numenius phaeopus	-	do.
		Peregrine Falcon	Falco peregrinus	-	do.
		Teal	Querquedula crecca	-	R. H. Artindale.
		Red breasted Rail	Porzana erythro- thorax.	-	do.
		Bohemian Chatterer	Ampelis phoenicoptera	-	through Capt. N. J.
		Hawfinch	Eophona melanura	-	Anderson St. "José."
			Garrulax picticollis	-	Geo. R. Corner.
		Eastern Bullfinch	Pyrhula griseiventris	-	do.
		Paradise Flycatcher	Pericrocotus cinereus	-	do.
		Large Reed Warbler	Telitrea incei	-	do.
		Black Albatross	Calamodyta orientalis	-	do.
				Yangtze entrance	Capt. C. H. McCaslin.

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1879.					
		Great horned Owl	Bubo maximus	-	A. M. Gary.
		Falcatad Teal	Eunetta falcata	-	G. C. Anderson s.s. "Apin"
		Pintail Duck	Dafla acuta	-	Dr. F. Burge.
		Avocet	Recurvirostra avocetta.	-	Dr. F. Burge.
		Cormorant	Phalacrocorax carbo.	-	E. H. Keney.
		Snake	Elaphis taeniurus	-	E. M. d' Almeida.
		Golden Eagle	Aquila chrysoetos	-	do.
		Egret	Garzetta egretta	-	E. A. Deacon.
		Hoopoo	Upupa epops	-	Spence.
		Yellownecked Heron	Ardetta flavicollis	-	Vict. Knott.
		Little Crane	Porzana minuta	-	do.
		Swallows	Cecropis arctivitta	-	Alfred Dent.
		Siberian Jack-daw	Lycos dauricus	-	
		A set of bow arrows, and arrows from South Sea Islands		-	
		Buzzard	Archibuteo strophia-tus.	-	do.
		Chinese fox	Canis vulpes	-	J. J. Tucker.
		Little spotted Civet	Viverra malaccensis	-	do.
		Great horned Owl	Bubo maximus	-	do.
		Wild cat	Felis sinensis	-	O. Brand.
		Wasps nest		-	M. C. Adams.
		Frog spawn		-	J. F. Rodewald.
		Cuckoo	Cuculus canorus	-	do.
		Long eared Owl	Otus vulgaris	-	A. M. Gray.
		Sparrow hawk	Accipiter stevensoni	-	John Rennie.
		Common Heron	Ardea cinerea	-	Douglas Jones.
				Shanghai	

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1879.					
Jan. 26		Red start	<i>Phoenicurus leucocephala</i> .	Shan	L. le Breton.
		White capped Red start.	<i>Ruticilla aurea</i>	-	do.
Dec. 19		Hoopoe	<i>Upupa epops</i>	-	do.
		Grey Wood pecker	<i>Picus mandarinus</i>	Chinkiang	E. J. Davies.
		Arsenic Paste (1 Pot)	-	-	W. R. Kahler.
		Chinese Otter	<i>Lutra sinensis</i>	Interior of Race-course, Shanghai	C. Beumann.
		Sparrow hawk	<i>Accipiter nisus</i>	Shanghai	M. Buchanan.
		Indian Rail	<i>Rallus indicus</i>	do.	do.
		Long eared Owl	<i>Otus vulgaris</i>	do.	do.
		2 Small fish	-	-	Capt. Orsted.
		Snake skin	-	-	W. S. Cox.
		2 Mandarin Ducks	<i>Anas gallericulata</i>	-	H. Sylva.
		1 Thrush	<i>Garrulax picticollis</i>	-	Geo W. Conner.
		1 Lot Butter flies	-	Kuangsi province	W. Mesney.
1880.					
Jan. 14		Bittern	<i>Botaurus stellaris</i>	Shanghai	Henry Morris.
Jan. 20		Rufous-backed Shrike	<i>Lanius schack</i>	Shanghai	D. C. Jansen.
		Long-eared Owl	<i>Otus vulgaris</i>	Woo-chow-fu	F. H. Mawhood.
		1 Box Sea Shells	-	Amoy	H. E. Hobson.
		Eastern Pelican	<i>Pelecanus crispus</i>	Wuhu	A. Lewis.
		Goosander	<i>Mergus castor</i>	Chinkiang	W. Harrison, R.N.
		Baer's Duck	<i>Fuligula baeri</i>	-	J. F. Rodewald.
		1 Pair	<i>Hidrohynchus Struthersi</i> .	Mongolia	Dr. Irwin.
March		Nest of Weaver bird	-	-	Dr. O'Grady, R.N.
		1 Pair Golden eyed Ducks (or Garrot)	<i>Bucephala clangula</i>	Tientsin.	Dr. Irwin.

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April	1	Black-eared Kite	<i>Melanus melanotis</i>	Shanghai	F. J. Williams
	1	Red start	<i>Phoenicurus leucocephalus</i>	do.	do.
	1	Eastern Crane	<i>Grus monacha</i>	Woosung	G. G. Hopkins.
	1	Goosander	<i>Mergus castor</i>	Chinkiang	Paym: Harrison "Modeste"
		Tortoise shell Turtle	<i>Chelonia umbricata</i>	-	Mr. Chin.
	1	Green Woodpecker	<i>Geococcyx guineensis</i>	Shanghai	R. H. Artindale.
		Sea Turtle	<i>Chelonia mydas</i>	Java Sea	Capt. Cutting, ship "Boyne"
	1	Common Heron	<i>Ardea cinerea</i>	Shanghai	Angustus Broom.
		Hoopoe	<i>Upupa epops</i>	Shanghai	W. Buchanan, s. "Eldorado"
	1	Beetle	<i>Scarabæus molossus</i>	-	S. D. Veitch.
May	1	Lesser Tern	<i>Sterna minuta</i>	Ningpo	H. B. Meyer, Ningpo.
	1	Sea Eagle	<i>Haliæetus albicilla</i>	Shanghai	Capt. Anderson "Appin"
	1	Golden eyed Duck	<i>Bucephala clangula</i>	-	do.
	1	Water cock	<i>Gallinula cristata</i>	-	J. M. Fabris.
	1	Esquimaux Curlew	<i>Numenius borealis</i>	Shanghai	W. T. Phipps.
	1	Japanese Single thorn	<i>Monocentris japonicus</i>	Japan Sea	R. Knott.
	1	Snake	-	Ningpo	P. Adams s.s. "Tunsin".
	1	Eastern Pelican	<i>Pelecanus crispus</i>	Foochow	R. W. H. Wood.
	1	Wandering Albatross	<i>Diomedea</i> sp.	Chusan Arch.	R. Knott.
	2	Oyster Catchers	<i>Haematopus ostralegus</i>	Gutzlaff	do.
May.	1	Painted Snipe	<i>Rhynchæa bengalensis</i>	Shanghai	C. J. Dudgeon.
	1	Black naped Ind. } Oriole	<i>Oriolus sinensis</i>	-	J. H. dos Rosarios.
	Collection of Snakes } (6)	-	-	-	Lieut. Leslie, R.N.

DATE.	NO.	CONVENTIONAL NAME.	SCIENTIFIC NAME.	WHERE FOUND	NAME OF CONTRIBUTOR.
1880.		An arrangement of silk cocoons in pendants from a circular top covered with red and green paper made and offered by women to the goddess Kwan-yin at the temple in Hsi-yuen, in the hope of having good silks crops.			
		Sea swallow	<i>Sterna hirundo</i>		A. Gordon.
		1 Beetle			Dr. Burge.
		1 Baer's Duck	<i>Fuligula baei</i>		T. Ramsey.
		1 Crab			J. M. Young.
		1 Birch bark water bucket made by the Ghilaos of the Amoor		Russian Tartary, Saghalien	T. M. Irwin s.s. "Appin"
		1 Butterfly			
		Common snake			H. Bolland.
		1 Land rail			W. Lamont.
		1 Blue Rock Thrush	<i>Ortigometra crex</i>		J. T. Cheetham.
		Common snake	<i>Petrocinela manilla</i>		W. T. Phipps.
		Hammer headed shark.	<i>Squalo marteau</i>		E. J. Davis.
		A 4 legged chicken			F. J. Marshall.
					R. Knott.
					J. A. Primrose.

Aug.

Oct.



DATA.	NO.	CONVENTIONAL NAME.	SCIENTIFIC NAME.	WHERE FOUND.	NAME OF CONTRIBUTOR.
1880.					
		1 Pair Pheasants	Pukras darwinii	Maucka cove Saghalien	W. Gubbius.
		1 Bottle Seaweed	-	Japan (Stream)	Capt. Anderson s.s. "Appin"
		2 do.	-	Vladivostock	do.
		1 Small fish	-	do.	do.
		1 Snake	-	Saghalien	do.
		1 do.	-	-	do.
		4 Star fish	Asterina gibbosa	-	do.
		1 Slow shrimp	Axius sturynchus	-	do.
		1 Raccoon Dog	Nyctereutes procyo- noides.	Nanking	Capt. N. P. Anderson.
		1 Hornets' nest	-	-	Messer Blain & Co.
		1 Cake wax	-	-	Père Heude.
		A few geological specimens.	-	-	I. M. G. Collaço.
		1 Kingfisher	Halcyon gularis	Amoy	H. E. Hobson
		1 do.	" coromandeliana	do.	do.
		1 Hen's Egg	-	-	C. M.
		1 Box Butterflies	-	Ichang	Jas. Reeks.
		Specimen of Larch Resin.	-	Amoor	Capt. G. C. Anderson.
		" Edible Seaweed	-	Saghalien	S. S. "Appin"
		" Fern with Seed	Osmunda (Regalis?)	-	do.
		" Beach Sand	-	Siberia	do.
		" Pebbles & Debris	-	Raka Maka Bay	do.
		" ditto (1)	-	Maucka Bay	do.
		" ditto (1)	-	Maucka Bay	do.
		" ditto (1)	-	Prough Point	do.
		" ditto (8)	-	Slariamsky Bay	do.
		" ditto (24)	-	Nicolaievsk	do.
		"	-	Dai Saghalien	do.

Oct.

DATE.	NO.	CONVENTIONAL NAME.	SCIENTIFIC NAME.	WHERE FOUND.	NAME OF CONTRIBUTOR.
1880.					
Feb. 3	1	" ditto (2) " ditto (1)	- - - Scutella sp.	Vladivostok - - - do. Apes' Hill, Takow, Formosa, very abundant, some individuals were raised up on their edge while others were embedded as they would have lain in life on sea bottom - Apes' Hill, Takow, Formosa, mostly small & evidently embedded in situ. do. A species of the genus of corals resembling cyclolites. do. Often of considerable size; was only able to find one sea urchin and that a small one.	do. do. Dr. H. B. Guppy. H. M. S. "Hornet."
	2	Barnacles	Balanidea		do.
	3	-	Corals		do.
	4		Spines of Echinoidea		do.
	5	-	Sp. of Pecten Ostrea and other bivalves		do.
	6	-	Casts of Spiral Univalves.		do.
	7	-	Polyzoan, Scutella etc on shells.	do. The lime stone in which these fossils abound.	
	8	-	Small crab, Sharks' tooth & some corals	dips to the East at an angle of 35° to 40°. Many of the fossils were cracked through and otherwise damaged as if from the pressure they were subjected to during the process of [up heaving]. The occurrence of polyzoa, balanidea, and serpula on some of the fossils (especially the scutella) shows that the limestone was formed gradually,	

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Feb. 3	904	Fossils.	-	since time was allowed for the growth of the parasites after the death of the animal on the shell of which they had planted themselves.	Dr. H. B. Guppy.
	907	do.	-	Found in lower part of Ape's Hill.	H. M. S. "Hornet".
	908	do.	-	Takow, Formosa.	do.
	911	do.	-	do.	do.
	912	do.	-	do.	do.
	913	do.	-	do.	do.
	914	do.	-	do.	do.
	918	do.	-	do.	do.
	920	do.	-	do.	do.
	926	do.	-	do.	do.
	928	do.	-	do.	do.
	929	do.	-	do.	do.
	930	do.	-	do.	do.
	931	do.	-	do.	do.
	932	do.	-	do.	do.
	933	do.	-	do.	do.
	934	do.	-	do.	do.
	935	do.	-	do.	do.
	936	do.	-	do.	do.
	937	do.	-	do.	do.
	938	Fossil	Scutella	Ape's Hill, Takow.	
	943	do.	do.	Lower part of Ape's Hill, exemplifying the cracked condition of some of the fossils.	

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1880.					
Feb. 3	914	do.	-	Lower part of Ape's Hill, Takow.	Dr. H. B. Guppy, H. M. S. "Hornet".
	945	do.	-		
	952	do.	-		
	953	do.	-		
	954	do.	-		
	955	do.	-		
	956	do.	-	from Saracen's Head, Takow.	
	961	Limestone	-		
	962	Compact Limestone	-		
	967		-	Lower part of Ape's Hill, Takow.	
	969		-		
	972	Fossils	-		
	975		-		
	976		-	Such as occurs in the higher part of the hill shewing the honey-combed and beaten surface.	
	977	Fossil Crab	-		
	978	do.	-		
	981	Fossil Scutella	-		
	982	Compact Limestone	-	Pescadores, Formosa Channel	
	983	Limestone	-		
	984	Fossil Scutella	-		
	986	do.	-		
	988	do.	-	Pescadores, Pong-hou Island.	
	990	do.	-		
	531	-	-		
	532	-	-	Conglomerate composed of	
	991	Calc-spar and red oxide of Iron	Hæmatite		
	992	-	Amygdaloid		
	993	-	-		

Dr. H. B. Guppy, H. M. S. "Hornet".

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1880.					
	994	Trap rock	-	coral debris, shells and fragments of basalt which is at present forming at high water mark Pong-hou Island. Finely cellular Trap rock occurring above the massive basalt Pong-hou Island.	
	995	Basalt	-	Pescadores, Pong-hou Island.	
	998	-	-	" Containing nodules of hæmatite. Pong-hou Island.	
	999	-	-	" Light coloured clayish rocks intervening between the "taterite" and the basalt and forming a layer 3 inches thick. Pong-hou Island.	
	1001	Basalt	-	"	
	524	Granite	-	Amoy, From the hills behind the city.	
	525	-	-	"	
	527	-	-	"	
	529	Granite	-	" from Kulangsu Island altered by the proximity of a trap dyke from the Island of Woo-seu of Amoy harbour.	
	886	Gneiss	-	" do.	
	887	Crystals of quartz and Felspar	-	"	
	888	Trap rock from some dykes	-	" do.	
	889	Gneiss	-	" do.	
	890	-	-	" do.	
Feb. 3	892	Trap rock from dykes	-	"	



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1880.	924	Granite	-	Swatow.	Dr. H. B. Guppy, H. M. S. "Hornet".
	922	Coloured Clay	-	" From a kind of vein in granite,	
	-	Granite	-	Chinchu, North of Amoy.	
	896	Granite	-	Namoa Island.	
	897	} Oolitic Granite ?	-	do.	
	898		-	Namoa Is land, Rock intermediate in cha-	
	901		-	racter between ordinary granite & felste	
	809	Granite	-	Pootoo Island.	
	812	Granite (imperfectly crystallised.)	-	do.	
	814	-	Porphyritic	do.	
Feb. 3.	815	Compact Granite	Enrite	do.	
	452	Porphyritic rocks	-	Ting-hai, Chusan, used for paving roads.	
	453	-	-	" a light coloured flinty	
		-	-	rock from the hills north	
		-	-	of Ting-hai city.	
	454	-	-	do. A slightly granular rock	
		-	-	from the top of the highest	
		-	-	hill north of Ting-hai city.	
	455	} Apparently a parti-	-	do. Hills, north Ting-hai city.	
	456		-	" "	
	457		-	" "	
	458	Dark flinty rocks	-	do.	
	461/1	Granite	-	do.	
		Light coloured por-	-	do.	
		phyritic rocks.	-		
	463	Light coloured flinty rocks.	-	N. Coast of Chusan	

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1879.					
	464	Dark flinty rock	-	Chusan. From the hills near the centre of the Island overlooking Ting-hai.	Dr. H. B. Guppy, H. M. S. "Hornet".
	465	Granite	-	" " From Baecon hill, N.W. of "	
	468/9	Dark porphyritic rock	-	" " do. "	
	471	Light coloured porphyritic rock.	-	" " "	
	473/4	Granite	-	" " From the hill overlooking the west wall of Ting-hai city.	
	816	Granite	-	" " from Joss house hill, Ting-hai city.	
		Undetermined rock	-	Yung river from some hills on the right bank 4 miles below Ningpo.	
	820	Flinty porphyritic rock	-	" " do. "	
	821	Apparently an argillite altered by heat	-	" " do. "	
	824	Flinty porphyritic rock	-	Yung river from some hills on the right bank 4 miles below Ningpo.	
	825	Undetermined rock	-	ditto	
	396	Light blue undetermined rock.	-	Snowy Valley.	
	397	Chocolate coloured undetermined rock	-		
	398	Rock intermediate in character between the syenitoid and calcareous rock.	-	Near the How-ying-tang.	
	399	Undetermined rock	-	From the highest part of the Maou-kao-tai	
	401	Conglomerate	-	From the Siang-yang kong 4 miles west of Shi-dou-za.	
	406	Dark limestone	-	From near the foot of the How-ying tang Falls.	

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1880.					Dr. H. B. Guppy, H. M. S. "Hornet"
	407	Hornblende rock	.	From the cliffs near the 400 feet Fall.	
	408	Light coloured rock often disintegrated	.	ditto.	
	410	Blueish rock, (undetermined)	.	From where the 400 feet Fall leaves the cliff.	
	411	A white rock apparently of quartz and felspar.	.	From near the Song-ying-tang.	
	413	} Hornblende rock;	.	From the cliffs near the 400 feet Fall.	
	416		.	From near the How-ying-tang.	
	417	Undetermined dark rock.	.	ditto	
	418	Syenitoid ? Rock	.	From the spar of the Pih-ko-shan.	
	419	Hornblende ? Rock	.	From the Pih-ko-shan water Falls.	
	421	Light coloured quartz rock.	.	ditto	
	422	White felspathic rock	.	ditto	
	423	do.	.	ditto	
	424	Loft white felspathic rock.	.	From the Siang-ying kong 4 miles.	
	425	ditto.	.	N. W. of Shi-dou-za.	
	427	Conglomerate	.	From the hill Siang-ying kong 4 miles	
	429	Undetermined light blue rock.	.	West of Shi-dou-za.	
	431	Dark clayish sandstone	.	ditto	
	430/2	Quartzite (2)	.	ditto	
	434	Red Argillite	.	ditto	
	435	ditto.	.	ditto	

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	436	Conglomerate	-	ditto	
	437	Dark quartz rock	-	Snowy valley From the Pookoo ling hill	
	438		-	" " From the top Siang-yang	
	439		-	Kong hill.	
	440	Brown Shale	-	" " From the Pookoo Ling hill.	
	440	Undetermined rock.	-	Tien dong near Ningpo.	
	445/6	Compact felspathic quartzite.	-	" " from the Hill overlooking the Temple at Tien dong on the West.	
	447	Quartz rock	-	" " From the valley one mile below the temple.	
	448/9	Quartz rock, streaked with felspar.	-	" " From hill on the east side of the hills at Shu-bah.	
	450	Quartz rock	-	" " From the hills one mile below Tiendong Temple	
	828	Shells	-	Hankow and neighbourhood, found on the banks of the Yangtze.	
	839	Alluvial clay shewing the burrows of worms	-	Hankow and neighbourhood, found on the banks of the Yangtze.	
	845	Shells	-	Hankow and Embedded found on the banks of the Yangtze.	
	842	Small rounded masses found in the worm burrows in the alluvial clay.	-	" " "	
	843	Laminated alluvial clay.	-	do " "	
	847	Quartz rock	-	do which forms the banks of the Yangtze at Hankow.	
			-	do From hills about 9 miles N.W. of Hankow.	

Dr. H. B. Guppy, H. M. S. "Hornet".

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1880.					
	843	Red clay rock	- Argillite	do From hills 405 miles west of Han-yang hill.	Dr. H. B. Guppy, H. M. S. "Hornet".
	850	Shells	- Paludinæ	do Found embedded in the banks of the Yangtze.	
	852	do.	-	" "	
	853	do.	-	" "	
	849	Sandstone	- Quartzite	" "	
	856	Quartzite	-	" From the Ta-kin-shan King-kan.	
	857	Clay slate	-	" "	
	858	Micaceous sandstone	-	" "	
	866	Quartzite sandstone	-	" Han-yang hills.	
	873	Conglomerate	-	Hankow & neighbourhood, Woochang hills	
	874	Sandstone	-	do. Takin-shan hills King-kan.	
	875	do.	-	do. do.	
	580	Quartz rock	-	do. From some hills on the right bank of the King-kan river	
				4 miles from the Yangtze.	
	882	Compact Limestone	-	do. do.	
	884	do.	-	do. do.	
				25 miles above the Yangtze.	
	884	Coarse sandstone	-	Kiukiang From Si-shan range of hills.	
	855	Talcose schist	-	do. do.	
	861	Sandstone	-	do. do.	
	862	Schistose rock	-	do. do.	
	864	Undetermined rock	-	do. do.	
	872	" grayish rock	-	do. do.	
	860	Hornblende slate	-	do. do.	
	876	do. schist	-	do. do.	



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1880.					
	476	A greyish heavy rock (undetermined)	.	Chefoo west of Chefoo harbour.	Dr. H. B. Guppy, H. B. M. S. "Hornet".
	477	Calcareous concretions	.	do. encrusting the white compact limestone west of Chefoo harbour.	
	486	Bluish flaky mineral	.	do.	
	487	Metamorphic limestone	.	do.	
	490	Granite rock	.	do.	
	491	Calcareous concretions encrusting metamorphic limestone	.	do.	
	492	Granite rocks	.	do.	
	493	White metamorphic limestone	.	do.	
	496	do. do.	.	do.	
	497	Mica schist	.	do.	
	499	Crystalline metamorphic limestone	.	do.	
	500	Mica schist	.	do.	
	501	Mica schist	.	do.	
	538	Mica schist	.	Chefoo west of Chefoo Harbour	
	539	do.	.	do.	
	741	Granite Rock	.	do.	
	746	Compound Mica schist	.	do.	
	747	Granite Rock	.	do.	
	748	Mica schist	.	do.	
	749	Quartz	.	do.	
			.	From the hills south of Chefoo harbour.	
	756	Mica schist	.	do.	

DATE.	NO.	CONVENTIONAL NAME.	SCIENTIFIC NAME.	WHERE FOUND.	NAME OF CONTRIBUTOR.
1880.	766	Mica schist	-	Chefoo from the hills south of Chefoo harbour.	Dr. H. B. Guppy, H. M. S. "Hornet".
	755	do.	-	do.	
	789	Gneiss	-	Mackau Island from the cliffs on the Is.	
	790	Quartz pebble	-	Corean archipelago; fits into the	
	791	Sandstone	-	hollow of the sandstone (specimen	
	795	Gneiss	-	791).	
	796	Undetermined rock.	-	Mackau Island from the cliffs.	
	798	do.	-	do.	
	801	Gneiss	-	do.	
	803	Undetermined rock.	-	do.	
	805	Gneiss	-	do.	D. C. J.
	806	Quartzite sandstone	-	do.	
	2	Hares	Lepus Sinensis	Shanghai	
	1	Eastern Pelican	Pelecanus philippensis	do.	
	2	Geese	Anser cygnoides	do.	
	2	Bean geese	Anser segetum	do.	
	9	Shoveler Ducks	Spatula clypeata	do.	
	1	Goosander	Mergus castor	do.	
	1	Curlew	Numenius arquatus	do.	
	1	Eastern crane	Grus monacha	do.	
	1	Woodcock	Scelopax rusticola	do.	D. C. J.
	1	Lapwing	Vanellus cristatus	do.	
	2	Green wood peckers	Gecinus guerini	Ningpo	
	1	Common crested myna.	Acridotheres cristatellus.	do.	
	1	Starling (grey)	Sturnus sericeus	do.	
	1	do.	" cinereus	do.	

DATE.	NO.	CONVENTIONAL NAME.	SCIENTIFIC NAME.	WHERE FOUND.	NAME OF CONTRIBUTOR.
1880.					
		1 Bi-coloured munia	Munia malabarica	Ningpo	D. C. J.
		1 Naumann's thrush	Turdus naumanni	Shanghai	"
		4 Mongolian Sand grouse.	Syrhaptes palasii	Chefoo	"
		12 Quail	Coturnix communis	Shanghai	"
		3 Red legged Partridges	Cacabis chukar	Chefoo	"
		5 Ring necked Pheasants.	Phasianus torquatus	Shanghai	"
		1 Silver Pheasant	Euplocornis Nycthemerus.	Kwangse	"
		1 Set of Head ornaments of a chief.		Admiralty Islands	Geo. L. Skinner.
		1 Aino's coat & leggings, woven from bark.		Japan	H. Liddell.
		1 Poisoned Spear		Admiralty Islands	Geo. L. Skinner.
		1 Blow pipe for arrows		do.	ditto.



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ARTICLE I.

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EARLY EUROPEAN RESEARCHES INTO THE  
FLORA OF CHINA.\*

BY  
E. BRETSCHNEIDER, M.D.

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IT is proposed in the following pages to give a sketch of early botanical researches in China by European naturalists and at the same time to rescue from oblivion some curious ancient documents showing the early attempts to illustrate the botanical features of the Middle Kingdom. I have thought that a critical review of these accounts in the light of modern science and a republication of some of them, which I found hidden in ancient periodicals, now little known and difficult of access, would prove of some interest and be even practically useful to collectors of Chinese plants and writers on the same subject.

Although many of the celebrated Chinese vegetable productions are mentioned in the book of Marco Polo and by other European mediaeval travellers in China, I do not intend to trace our early acquaintance with Chinese plants back as far as the middle ages. In my investigations I shall start from that period when these regions became first known to us through the learned and hard-working Jesuit missionaries, the illustrious pioneers of Oriental studies in the far East. On the other side, I shall not extend the area of my researches beyond the Linnean period.

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\* Read before the Society on the 19th November, 1880.



# I.—BOTANICAL INFORMATION WITH RESPECT TO CHINA SUPPLIED BY THE JESUITS.

I may premise, although these facts are generally known, that, after the Portuguese had made their appearance in Chinese waters in the beginning of the 16th century (Raphael Pestrello in 1516, Ferd. Andrade 1517), they subsequently established factories at Ningpo, carrying on trade also with Amoy. Besides this they settled near Canton and at Macao which latter place on account of its favourable situation soon became the basis and the starting point for the commercial enterprises of the Portuguese in Eastern Asia. It is also well known that *Franciscus Xavier* was the first Jesuit missionary, who ventured to visit China in 1552, but he died in the same year on an island called Sançian in sight of the Chinese coast. Nearly 30 years elapsed before a new attempt was made by the Jesuits to gain a footing in China. From 1581 to 1583 they sent successively four missionaries to Macao. One of them was *Matthæus Ricci*, who holds one of the most conspicuous places in the history of the Chinese missions. By persevering efforts he obtained permission to reside at Peking, where he arrived in A.D. 1600. At the time of Ricci's death, in 1610, the number of Jesuit missionaries in China had already considerably increased and we find them then working in many parts of the Empire, (besides *Peking*), namely at *Canton*, at *Shao chou fu* (Kuang tung province), at *Nanking*, *Shanghai*, *Su chou fu*, *Sung kiang fu* (all in the province of Kiang nan [Kiang su]), in which they then had altogether 90 churches; at *Hang chou fu* (Che kiang prov.); at *Nan ch'ang fu* (Kiang si prov.). In the provinces of *Hu kuang* and *Sze ch'uan* they had also built many churches and it appears, that at that time there were missionaries also in *Fu chou fu* and in some places of the province of *Shan si*. They were not only assiduously labouring to learn the language and to preach the gospel, but they employed themselves also in acquiring knowledge of the customs of the people and their literary works and they directed their attention likewise to the features of the country and its natural productions etc. The Jesuit missionaries have always had the well-merited reputation of great learning and of a classical and scientific education; and it seems that those, who were sent to convert the Chinese, had been especially trained with the object of convincing the latter, by means of striking experiments,

of the superiority of western science, and of demonstrating to them the accuracy of Europeans in observing natural phenomena, and their ingenuity in making the laws of nature serviceable to the purposes of industry, economy and the arts. The early success enjoyed by the propaganda of the Jesuits in China was principally due to the great authority they had acquired at the Court of Peking on account of their skill in astronomy, physics, chemistry etc. Many of these distinguished scholars used to investigate with a strong inclination objects of natural history, and thus we find in the collections of the letters and memoirs of the Jesuits in China a great number of articles treating of mineralogy, zoology, and botany, supplying a mass of most valuable information. The circumstances, in which they lived among the natives, becoming familiar with the language and adopting the native customs, gave them many more facilities for gathering information than travellers or naturalists of the present time, who are looked upon with suspicion, constantly watched, and often molested by the people. There are still in the interior of China many common Chinese plants, known to us only from the description of the Jesuits, as for example the tree, which yields the *varnish* for making the well known Chinese lacquered ware, or the *Illicium anisatum* of China (Loureiro). No specimens of these trees have, as far as I can judge from what has been published with respect to Chinese plants, come to the notice of later botanists.\*) I need hardly say, that the accounts left by the early missionaries, concerning Chinese botany, have for the greater part no claim to be considered scientific papers in our modern sense. Their descriptions however of the plants applied by the natives to economic or other useful purposes, and also of wild-growing medicinal and other remarkable plants, are generally quite satisfactory and popularly correct. The Chinese names are often added. In most of the cases there can be no doubt what plant they meant and we are thus enabled to supply the respective scientific names, as far as these plants are known to botanists.

It does not seem, that any botanical collection was sent from China to Europe by the Jesuit missionaries previous to the middle of the 18th century. Father *d'Incarville*, who resided

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\* I shall treat at greater length of these and similar botanical questions relating to China in a more comprehensive treatise on Chinese botany, which is now in course of preparation.

in Peking between 1740 and 1757, appears to have been the first who collected plants and seeds for his instructor Bernh. de Jussieu, as will be shown in a subsequent chapter.

The scope of this paper is not intended to give a full account of all that has been written by the Jesuits in China on botanical matters. That would unduly swell the limits of this chapter. I shall draw up merely a list of their works or scattered minor articles dealing with the vegetable productions of the Middle Kingdom, selecting only a few memoirs, presenting a particular interest for a more detailed review, reproducing occasionally the text in the original.

But before proceeding to a chronological survey of these publications of the ancient Jesuit fathers, one of the earliest works on China, published before their advent, deserves to be noticed here.

**J. GONZALEZ de MENDOZA's HISTORY OF THE GREAT AND MIGHTY KINGDOM OF CHINA** was first printed in Spanish, in 1585, in Rome. An English version of the book (to which I refer) was published in 1853 by the Hakluyt Soc. Mendoza, an Augustin monk, had himself never seen China. The material for his book has been derived from the reports of some friars of the same order, who had found opportunity to visit China. He depends mainly upon the accounts furnished by the monk *Martin de Herrada*, who had been taken, in 1575, by a Spanish ship from *Manilla* to the Chinese port of *Ts'üan chou fu* (prov. of *Fu kien*) where he was allowed to spend three months. The information given in this little book with respect to the vegetable productions of China (I, 14. 15. 82.) are very meagre but not devoid of interest. The excellence of the Chinese *Chestnuts* is there praised and there is noticed also the great abundance of large *Melons*. We are further told that "the Chinese have a kind of *Plum*, that they call *leechias*, of an excellent gallant taste." This is, I think, the first mention made by Europeans of *Lichis* (***Nephelium Litchi*** Camb.). We are further more informed in the same work that the Chinese, besides Wheat, Barley, Millet (panizo), cultivate also the same **Maize**, which constitutes the principal food of the Indians in Mexico. This latter statement made at so early a date has a peculiar interest for us, for it is now a well established fact that Maize is not indigenous to China but has been introduced since the discovery of America.

One of the earliest accounts given of the Chinese Empire by Jesuit missionaries is that by **ALV. SEMEDO**. He was of Portuguese origin, born 1585, arrived in China in 1613,

and died in Macao in 1658.\*) As he himself states in the preface to his **RELATIONE DELLA GRANDE MONARCHIA DELLA CINA**, he wrote this work about 1633, but it was first published only in 1643, in Rome. I quote in the following the French translation of it made by Coulon 1645, but translate the quoted passages into English.

The following are the remarks of Semedo concerning Chinese plants :

1. The **Peaches** of the province of Xensi (Shensi) are of prodigious size, some of them of a red color outside as well as inside, others yellow and resembling our peaches. The same province is also famed for its **Grapes**. (p. 8.)

2. The province of Honan produces the best **Apricots**. (p. 22.)

3. The prov. of Xan tung (Shan tung) abounds in large and excellent **Pears** (p. 29.)

These large pears are already mentioned by Marco Polo (Yule ed. 2. II 184.)

4. There is a kind of fruit grown everywhere in China, which they call *su zu* in their language. The Portuguese use to term it *red Fig*. It bears however no resemblance to a fig, for it is of a red color outside, contains a gold-colored pulp and seeds resembling almond kernels. Its shape is that of an orange but it varies in size. It has the skin very soft and is of a delicious flavour. The best are grown in the colder parts of China, viz. in the provinces of Honan, Xensi (Shensi), Xian si (Shan si), Xan tung (Shan tung) and especially in the last named, where they use to dry them and send them off to the other provinces of the Empire. When dried this fruit resembles somewhat our figs, but it is superior in flavor. (p. 7.)

This is without doubt the **Diospyros Kaki** L. (*D. Schitze*. Bge.) a very common fruit tree all over China, where a great many varieties of it are cultivated. The Chinese name of the fruit is 柿子 *shi tsz'*, in the Amoy dialect *su tsu*.

5. The Jesuit Father *Ferraris* in his *Hesperides* (publ. in 1646) p. 430, describes an *Aurantium sinense olivae magnitudine figuraque olivae*, referring to Semedo. This is probably **Citrus japonica** Thb., var. *fructu elliptico*, of which Semedo seems to have communicated some account to Ferraris.

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\* The biographical notices given in this paper concerning the Jesuit missionaries, are for the greater part derived from the pamphlet published in 1872 by the Jesuits at Shanghai under the title of: *Catalogus Patrum ac Fratrum e Soc. Jesu qui in Sinis adlaboraverunt*.



6. The province of Han chu (probably *Hang chou fu*, the capital of Chekiang, is meant), produces a peculiar fruit called *yam mai* by the natives. It is of the size of a plum, of a globular shape and resembles in color and taste the mulberry. The tree to which this fruit belongs bears however no resemblance to the mulberry tree. (p. 8.)

The author means the *Myrica sapida* Wall., a common fruit in Chekiang, in Chinese 楊梅 *yang mei*.

7. The province of Peking produces **Maize, Wheat** and some **Rice** for the use of the Emperor's court, the mandarins and the soldiers. An excellent kind of rice, which they eat boiled in water, without other ingredients, comes from Nanking. (p. 5. 30.)

This is the rice known under the name of *glutinous rice*. In Peking it is called 江米 *Kiang mi*.

8. The island of Hai nan produces the famous odoriferous *Eaglewood* and the wood called *hua li mo* by the natives, *Rosewood* by the Portuguese. (p. 13.)

According to Loureiro (Fl. coch. 327.) the Aloewood (or Eaglewood) of Cochinchina is yielded by *Aloexylon Agallochum*, but nobody after Loureiro has seen this tree. In India *Aquilaria Agallocha* Roxb. is said to produce Aloewood.—The wood which the Chinese call 花梨木 *hua li mu* is well known in this country and sold even at Peking, but the tree by which it is produced is unknown to botanists.

9. Belle-Isle (thus Semedo terms Formosa) produces *Pepper* which grows in the forests. *Cinnamon* is found there in the mountains. The *Camphor trees* of this island attain an extraordinary height. *China-root* and *Salsapariglia* are also found there. (p. 15.)

Camphortrees (*Cinnamomum Camphora*. Nees) are indeed a prominent feature of Formosa. Chinese Cinnamon (*Cinnamomum Cassia* Bl. and other species) is known to grow in the provinces of Kuangsi and Kui chou. I am not aware that modern travellers have noticed it in Formosa. China-root is *Smilax China*, L. and other species.

10. The *Rhubarb* plant is found in the province of Xensi (Shensi). It grows to a considerable height. Its leaves are larger than those of cabbage. (p. 23.)

At the time of the Ming dynasty the present department of *Sí ning fu*, still famed for its Rhubarb, belonged to the province of Shensi.

11. In the province of Liao tung a root is produced which is sold at the double price of its weight in silver. It is a marvellous medicine, which is able to increase the strength of the frame and to restore the exhausted animal powers. The Chinese call it *Gin sem*. (p. 31.)



This is it seems the earliest mention made by a European author of the celebrated *Gin seng* **Panax Ginseng** C. A. Mey., sin. 人參 *jen shen*.—Liao tung is an ancient name for the present Shin king or Chinese Manchuria.

12. They have a kind of fragrant flowers, called *la mui*, which appear in winter after the leaves have fallen. They are of a yellow color and waxlike appearance.

**Chimonanthus fragrans**. Lindl. sinice: 臘梅 *la mei*. It puts forth its flowers in December, in Peking. (p. 9.)

13. They have also a kind of lily (*Lys.*) which they term *tiao hoa* and keep it in their houses. For these plants thrive and blossom in the air with their imperishable roots out of the ground (p. 6.)

According to Bridgman's Chin. Chrestom. (resp. Dr. Williams) p. 452 (5). 吊花 *tiao hua* (hanging flower) is the Chinese name for the Airplant. The latter is a general name for several species of **Aërides** and **Vanda**, possessing the peculiar property of existing many months suspended in air.

14. Large boats loaded with *Lamp-wicks* are frequently met on the rivers in China. These lamp-wicks are made from the pith of a rush, which the Chinese know how to take out.

This rush is, as Dr. Hance has first proved, (Journ. of Botany 1875 p. 106) the **Juncus effusus**. L.

15. Semedo is the first of the missionaries who notices the *Tea* plant in China and who gives some account of the preparation of the leaves and their use. He states that *Cha* (茶) is the name of the leaf of a tree, which resembles the Myrtle etc. (p. 27.)

16. Semedo mentions also (p. 7.) among the fruits of Canton and Fukien the *Lichi* (**Nephelium Litchi**. see above Mendoza) and first speaks of the *Lum yen* (**Nephelium Lungan**. Camb. sin: 龍眼 *lung yen*.)

17. Finally Semedo reports (p. 4.) that the Chinese have an excellent *Varnish*, which they call *charam*, and which is yielded by a tree.

There can be no doubt, that S. means the famed Chinese varnish, sin. 漆 *t'si*, produced by a kind of *Rhus*, but I am not prepared to give any explanation, with respect to *charam*, which cannot be a Chinese name. He repeats the same name on p. 12. Constancio in his Dicionario da lingua Portugueza states that this term, still in use in Portugal to designate Chinese Varnish, is of Asiatic origin.

We come next to **MARTINI's** famous **ATLAS SINENSIS**. *Martinus Martini* was born in 1614 at Trent (Southern Tyrol, Austria). He arrived in China 1643, returned in 1653 to Europe by way of Batavia and landed at Amsterdam, where he made arrangements for publishing his

work. After this he proceeded to China again and died at Hang chou fu (Che kiang) in 1661.

The first edition of Martini's *Novus Atlas Sinensis*, published in Latin, bears no date but the concession for printing is dated Vienna January 7. 1655. This work is a short geographical description of the provinces of China, translated it seems from a Chinese work, but the author has added also many of his personal observations. I shall extract those passages relating to the vegetable productions of the different provinces.

1. Territorium urbis Peking producit optima *Poma*, *Pyra*, *Pruna*, *Frumenti* ac *Milii* non parum, *Leguminum* omnia fere genera. *Nuces* adhaec habet et *Castaneas*, nec non *Ficus* et *Uvas*, ex quibus tamen vinum non coficiunt. (p. 32.)

2. Provincia Xantung, (Shan tung) producit optima varii generis *Pyra*, *Castaneas*, nucesque alias, *Prunorum* verum vim tantam, ut siccata ea sicuti et *pyra* recentia, cum reliquis communicet provinciis: ad haec pomi ibi genus est, *su cu* vocant incolae, quod licet in aliis reperiatur provinciis, illic tamen abundat magis. (I omit the detailed description of the fruit.) (p. 53.)

By Martini's Plums we have probably to understand *Jujubes* for which the province of Shantung is famed as well as for the *shi tsz* (*su tsu*, comp. above Semedo 4.). The description Martini gives of the *Diospyros Kaki* is in accordance with Semedo's account of the same fruit.

3. Urbs Tung chuen (Sz' ch'uan prov.). Magnus *Castanearum* ac *Prunorum* ubique proventus, sed et *Saocari cannas* fert. (p. 70.)

4. Urbs Quei te (Honan prov.). *Granata* hic sunt praestantissima a quorum copia ac praestantia ultima civitas Xe ching nomen habet, quasi dicas pomorum granatorum moenia. (p. 60.)

The Chinese name of the Pomegranate is 石榴 *shi liu*, but the name of the city to which M. evidently alludes is 柘城 *che ch'eng hien* and this name has nothing to do with the pomegranate.

5. Urbs Tali (prov. Iunnan). In hoc tractu *Ficus* nascuntur Europaeae, quas Sinae *vu hoa* quo dicunt, ex eo indito nomine, quod nullo praevio flore ut reliqui fructus solent crescat, *Vu hoa* enim "sine flore" significat, "quo" vere fructum. (p. 158.)

The common Fig, *Ficus Carica* L., sin. 無花果 *wu hua kuo* (fruit without previous flower) is cultivated throughout China, but is not indigenous there.

6. Martini speaks of the superior quality of the *Grapes* in the prov. of Shansi. The natives do not use them for making wine, as the missionaries do, but only dry them in order to sell these raisins all over China. (p. 37.)

7. Urbs Focheu (prov. Fo kien). Maxima est in australibus hujus provinciae partibus et praecipue in hujus urbis territorio copia fructus illius quem *Lichi* vocant, Lusitani Macaenses *Lichias* dicunt. Nascitur in magnis procerisque arboribus, quarum folia Lauri imitantur, e ramorum summitatibus racemi prodeunt, in his ut in uvis fructus est, sed rarior ac longioribus pedunculis dependet. Fructus figura omnino croculum refert, magnitudine nucem aequat juglandem, parvum strobulum seu nucem pineam repraesentat, squamoso sed non adeo crasso cortice, nam ad membranae tantum crassitiem accedit, adeoque vel sola manu facile detrahitur. Intus succulentus est nucleus albi coloris saporis ac odoris rosacei suavissimi, cum maturus est fructus purpurei est coloris, videaturque ipsae arbores purpureis circumquaque quasi cordibus ornatae, amoenissimo aspectu astantium oculis arridere. Os seu calculus caro intus ambit, ac circumdat, qui quo mole minor est, eo censetur fructus melior ac praestantior. Recte hunc fructum regem fructuum dici posse, saepe ego mecum cogitavi, qui quasi esui ac spectantium voluptati natus tantum esset, ita delectat, ut numquam satiet. (p. 122.)

Urbs Ping lo (prov. Quang si). Lichiarum fructus magna ubique copia, cujus arbores *Li pu* civitati nomen dederunt. (p. 145.)

Alter etiam fructus quidam rotundus est, cortice superiori haud absimilis, *lung yen*, hoc est draconis oculum, vocant; superiori mole non aequalis est, paulo minor ac rotundior, ut cerasa fere nostra majora, pelle tamen aliquantulum lichi duriori magisque squamosa constat. Utrumque etiam Sinae exsiccant et ex hac provincia (Fo kien) per totum imperium ad delicias etiam siccus distrahitur, nullo tamen modo cum recentibus comparari potest, cum suavissimus ille succus totus fere exhalarit. Ex lichia etiam exprimitur liquor, quem vinum Sinenses vocant, suave satis sed rarius (p. 122.)

Est et fructus in hoc territorio quem Sinae *Mui gin li* vocant, i. e. pulchrae mulieris pruna eaque magna sunt ac praeclara quae Damascena illa magnitudine ac praestantia superant, figura rotunda magis sunt quam elliptica aut ovali. (p. 122.)

The fruits here mentioned *Nephelium Litchi*. Camb and *Nephelium Lungan*-Camb. The 美人李 *mei jin li* is evidently a Plum.

8. Urbs Chang cheu (prov. Fo kien). In hujus ac superioris urbis (Ts'üan chou fu) territorio uberrime proveniunt *Poma aurea* nobilissima, mole ac magnitudine Europaeis majoribus paria, odore, suavitate atque amoenitate ea omnia longissimo superant intervallo; nec arboris figura aut modus a nostratibus

multum discrepat, sed fere par est, fractus vero in eo differt, quod comestus uvam omnino referat, quam muschatam vocant, ejusdem enim plane odoris ac saporis est, adeo ut suavius quidquam in hoc genere nec Italia hactenus, nec Hispania viderit aut gustarit. Ita vero hic fructus a natura est comparatus ut aureum suum densioremque corticem facile dimittat, pulpa vero intra pelliculas, quibus vestitur ac distinguitur, eadem facilitate in particulas suas dividitur. Eundem fructum simul cum cortice inter asseres pressum saccharo condiunt, totoque anno adservant neque Sinas suos tantum, sed et externos his deliciis pascunt ac recreant. (p. 125.)

Urbs Chang te. (prov. Hu quang). *Poma aurea* omnis generis profert, inter quae illa sunt quae hyberna a Sinis vocantur. Cum enim jam cessant reliqua, haec primum hyeme maturescunt et suavissimi sunt saporis. (p. 80.)

The first of the Orange here described is that known among European residents in China under the name of *Mandarin-orange*, the rind of which separates spontaneously from the pulp. The other may be the so-called *Coolie-orange* known by its closely adhering skin.

9. Provincia Quang tung. *Poma aurea* hic ac *Citria* omnis generis sunt, etiam praestantissima illa quae supra in prov. Fo kien descripsimus. Unum praeterea genus est particulare, *Yeu çu* Sinae vocant, Lusitani *Jamboa*, Hollandi *Pampelmoes*. In spinosis arboribus ut limonia poma solent nascuntur, arbores tamen illis majores sunt, flores etiam similes omnino albosque proferunt suavissimi odoris ex quibus aqua etiam fragrantissima destillatoria arte elicitur; fructus autem citria omnia etiam illa maxima longe superat magnitudine, quippe qui capitis humani molem aut aequet aut excedat. Cortex reliquis pomis aureis similis est colore, pulpa interna rubescit, dulcedinem aliqua aciditate permixtam obtinet uvamque sapore refert non omnino maturam, proptereaque ex eo etiam liquor pro potu exprimi solet, uti in Europa ex cerasis, pyris ac pomis pro sicera: suspensus domi fructus ad annum perdurat. (p. 131.)

This is the *Citrus decumana*. L. sin: 柚子 *yu tsz'*.

10. Urbs Chang te (prov. Hu quang). Habent etiam *Cedros* illas, quas *Idoli manum* vocant, extremitates enim illarum in caudulas aliquas ceu in digitos ac pedunculos desinunt. Esui apti non sunt, at domi intra cubiculum suspensi suavissimum exhalant odorem, quam obrem sacculos reticulato opere ex serico artificiose contextunt. (p. 80.)

*Citrus medica*, var. *chirocarpa*. Lour. sin: 佛手 *fo shou* (Buddha's hand.)



11. Urbs Kiun cheu in insula Hai nan. Crescunt hic ubique *Nuces Indicae majores ac minores*, fructusque ille vulgo habitus totius orbis maximus, quem *Jaca* in India vocare solemus, qui ob eximiam magnitudinem non in ramis arborum, quamvis illi quoque ingentes sint, sed ipsi trunco adnascitur, quasi ex metu, ne tantum onus rami ferre detrectent quantumvis firmi aut robusti fuerint. Fructu cortex adeo durus crassusque est, ut securi aperiendus sit. Innumerae intus domunculae seu folliculi sunt, in quibus pulpa est flavi coloris, quae nucem veluti castaneam ambit; illa ubi maturuit suavisima est; haec igne tostas castaneas nostrates refert. (p. 140)

1. *Cocos nucifera* L.—2. *Areca catechu*. L.—3. *Artocarpus integrifolius* L.

12. Prov. Quang tung. Fructus quoque hic ubique plurimi sunt et praestantissimi, Europaei non pauci: *Poma granata*. *Uvae*, *Pyra*, *Nuces*, *Castaneae*, at hisce terris proprii ac singulares: *Musae*, *Nuces indicae*, *Ananas*, *Lichia*, *Lung yen*, *Poma aurea* etc. (p. 131.)

13. Urbs Gu cheu (Martini means Wu chou fu in Kuang si.) Nascitur arbor *Quang lang* vocata, haec pro medulla mollem pulpam obtinet farinae simillimam, quin et farinae usum praestat, saporisque non ingrati est, ad quaevis esculenta adhibetur. (p. 145.)

Sin: 光榔 *kuang lang*. *Caryota*.

14. Urbs Kia hing (prov. Che kiang). Nascitur per totam hanc regionem in stagnantibus aquis fructus figura rotundus, *Peci* Sinae vocant, cujus magnitudo castaneam nucem haud multum excedit, pellis subtilissima pulli coloris nucleum vestit, cujus intus candidissima caro est plena succi, gratique saporis, durior est quam pomorum vulgarium, ac parumper acida. Si simul cum hoc fructu cupream monetam ori immiseris, dentibus eadem facilitate qua fructum comminues, ac in pulpam comestibilem rediges, mira naturae vi, mihiq; alias ipso experimento saepe comperta. (p. 113.)

This is *Eleocharis tuberosa*. Schult. sin: 蒹 薹 *pi ts'i* cultivated throughout China.

15. Urbs Xun te (Shun te fu, prov. Chili). *Talo* lacus magnus fructu aquatico *Lin kio* dicto celebris. Hic fructus tribuli fere habet figuram, ad instar triangularis pyramidis undequaque prominens, cortice viridi crassiorique est, ad apices rubescente, dum siccatur nigrescit, interior substantia albisima est, sapore castaneae nucis, magnitudine tres quatuorve castaneas aequat. In stagnantibus aquis per totam Sinam seritur. Planta foliis est exilibus longissimo tractu per aquae



summam superficiem proserpentibus, fructus multiplices sub aquis latitant. (p. 34.)

*Trapa bispinosa*. Roxb., extensively cultivated in the lakes and rivers of Northern China. Sin: 菱角 *ling kio*.—The marsh of Ta lu 大陸澤 is situated in the southern part of Chili.

16. Prov. Kiang si. On p. 87 Martini gives a detailed description of the *Lien*, a waterplant found in all parts of China. The roots and the seeds of it are eaten. This is *Nelumbium speciosum*. W. sin: 蓮. *lien*.

17. Prov. Quang tung. Non tamen hic praetereunda *Rosa sinica* est, illa nimirum, quae diebus singulis bis colorem mutat, purpureaque modo tota, modo rursus omnino alba evadit. Caret suavitate odoris, in arbore nascitur. (p. 132.)

*Hibiscus mutabilis*. L.

18. Urbs Iengan (Yen an fu in Shensi). Florem profert *Meutan* dictum maximeque estimatum a Sinis, quasi florum regem diceret, rosa nostrate major est, hujus tamen figuram imitatur, sed folia magis expandit, odore quidem cedit, at pulchritudine superat, spinis caret, coloris est magis albicantis quasi ex purpureo et albo misti. Rubri etiam et flavi reperiuntur. In virgulto nascitur Sambuco nostrati haud absimili. Per totam Sinam hic flos in divitum viridariis colitur, idque magna arte et diligentia in calidioribus quippe locis aestate contra solis ardores regi debet. (p. 51.)

According to Chinese authors the 牡丹 *mu tan*, or *Paeonia montan* Sims., is found in a wild state in the mountains of the southwestern part of Shensi. Martini is the first European who notices this handsome Chinese flower introduced into European gardens only in 1789.

19. Urbs Kin hoa (prov. Che kiang.). Nascitur hic flos ille quem in India Lusitani *Mogorin* vocant. (Latinum illius nomen nusquam reperio.) In parva nascitur arbustula, flos albusissimus Gensemino non absimilis nisi quod plura habet folia. Odorem exhalat suavissimum Gensemino multo nobiliorem. Est apud Sinas in magna aestimatione. (p. 114.)

This is *Jasminum Sambac*. Ait., the 茉莉花 *mo li hua* of the Chinese.

20. Urbs Quei lin (prov. Quang si). Maxima ex parte nomen habet a *Quei* floribus, qui licet per totam reperiantur regionem Sinarum, nullibi tamen copiosiores sunt quam in hac provincia, maximeque in hujus urbis territorio unde urbi Quei lin nomen inditum, quod Quei florum sylvam sonat. Nascitur autem Quei flos in procera arbore, quae folia habet lauri, aut Cinnamomi. Flos minimus est, ac flavi coloris, in racemulos dispergitur, suavissimi plane odoris; flos apertus in ipsa

arbore longo admodum tempore perstat integer, minimeque flaccescit, ubi decidit, interjecto mensis unius spatio denuo arbor repullulat, novumque florem gignit autumnali tempore; tam fragrantem gratumque exhalat odorem, ut regionem totam cui arbor vicina est, a suavitate recreet atque perfundat. Latinum illius nomen nusquam reperio: is ipse autem flos est, quem Turcae limonum succo maceratum ad crines equorum tingendos adhibent. Ex eodem Sinae multa bellaria ori ac naribus gratissima adornant. (p. 143.)

The tree here described is the 桂花 *kui hua* of the Chinese, the *Olea fragrans* Thb. of botanists. M. is wrong in supposing it to be the Henna of the Mohammedans, which is *Lawsonia alba* Lam., also cultivated in Southern China.

21. Urbs Cin cheu (prov. Quang si). *Cinnamomum* profert praestantissimum, a Ceilani cinnamomo in eo tantum differt quod odoris sit fragrantioris, majorisque mordacitatis, dum linguae imponitur. (p. 146.)

*Cinnamomum Cassia* Bl., *C Burmanni* Bl. and perhaps other species furnish the Cassia bark of China.—By Cin cheu M. means 潯州府 *Sin chou fu*. In the same prefecture near the town of Tai wu, according to Mr. Moss (Narrative of an exploration of the West river. 1870.) the best Cassia bark is produced.

22. Provincia Yun nan (Yun nan). *Mo pang* munimentum maxime australem ac occidentalem hujus provinciae partem occupat. *Piper* profert. (p. 165.)

23. Provincia Kiang nan. *Cha* folium (p. 106). A good description of the Tea plant, its cultivation, preparation of the leaves etc. The best quality is said to be that of *Sung lo*.—On p. 158 M. notices the tea of the prefecture of Ta li in Yün nan.

I have omitted Martini's treatise on tea (茶 *cha* in Chinese) for the subject is too well known and M. not the first European who mentions tea. The 松蘿 *sung lo* mountains separating the provinces of Che kiang and An hui, are still famed for their superior quality of tea.

24. The province of Kiang nan (Kiang su and An hui) famed for its Cotton and manufacture of cotton cloths, especially the cities of Sung kiang and Shanghai. (p. 94. 101. I omit the details.)

25. Urbs Nan kang (prov. Kiang si). Producit haec urbs *Cannabim* ex qua vestes aestivas contra calorem ac sudorem aptissimas texunt. (p. 88.)—Urbs Xao (Shao) wu (prov. Fo kien). Texit hujus urbis plebs pannos praestantissimos ex crudo Cannabe, qui aestati tempore ob frigiditatem et quia sudore

maefacti non sordescunt, citoque siccantur, vulgo expetuntur et in pretio sunt. (p. 128.)

**Boehmeria nivea.** Hook. et Arn., from the fibre of which the so called Chinese *Grasscloth* is manufactured.

26. Urbs Li ping (prov. Quei cheu). Pannos conficiunt incolae ex cruda Cannabe, seu herba Cannabi prorsus simili. *Co* Sinae vocant. Ex his vestes pro tempore aestivo eximiae plane sunt, ac commodissimae. (p. 152.)

**Pueraria Thunbergiana** Benth. (*Pachyrhizus Thunbergianus* S et Z.) Sin: 葛 *Ko. l. trilobus* D.C. has the same Chinese name. It seems that both of them are textile plants.

27. Urbs Ping lo. (prov. Quang si) Conficitur hic pannus ex foliis *Musarum rubrarum*. (p. 145.)

In the *Yi t'ung chi*, the great geography of the Ch. Empire, the 紅蕉布 *hung tsiao pu* (cloth made from the red *Musa*.) is mentioned as manufactured in the prefecture of Ping lo. Perhaps the *Musa coccinea*. Andr., introduced into European gardens from China in 1792, is meant. I am not aware whether the appellation of red *Musa* could be applied to *Musa textilis* Nees.

28. Urbs Cin cheu (prov. Quang si). Incolae ex herba *Yu* conficiunt pannos, quorum praestantia sericum ipsum superat, majorque quam istud in pretium sunt. (p. 146.)

The plant *yu* and the fabric manufactured from its fibres seem to be unknown to Europeans. In the *Yi t'ung chi* I find under Sin chou-fu (vide supra 21) a cloth mentioned there produced which they call 紵布 *chu pu* or 鬱林布 *yü lin pu*.

29. Provincia Xan tung (Shan tung). Rarum est, et omnino nimium quantum beneficae in eam gentem naturae argumentum, filum sericum ibidem in arboribus ac campis sponte sua nasci, quod non a domesticis bombycibus, sed a vermibus contextitur erucis haud absimilibus, non in globum aut ovum ductum, sed in longissimum filum paulatim ex ore emissum, albi coloris, quae arbusculis dumisque adhaerentia, atque a vento huc illucque agitata colliguntur, atque ex illis, uti ex vera bysso, panni conficiuntur serici qui licet rudiores nonnihil sint serico domestico, firmitate tamen ac robore superant. (p. 53.)

Martini alludes here to the wild silkworms feeding on the leaves of different oaks and producing the silk from which the so called Shan tung Pongee is woven (繭綢 *kien chou* in Chinese.) Comp. Dr. Hance's interesting article on Northern Chinese silk worm oaks, Journ. Linn. Soc. X. XIII. and Du Halde, la Chine II 207.

30. Martini explains (p. 39) the method adopted by the Chinese in the production of *Weeping Willows* by bending down large branches of the *lieu* or Willow tree, which generally has upright branches, and causing them to take root in the ground.

I may observe, that *Salix babylonica* L. in Europe and Western Asia is generally seen with its branches hanging down, whilst in China (in Northern China at least) where this tree, 柳樹 *liu shu* in Chinese, is very common, its branches shoot originally upwards. In a similar way the Chinese produce artificially the tree known in Europe as *Sphora pendula*, in causing two young trees of *S. japonica* L., growing close together, to join by grafting, and then turning upwards the roots of one of them.

31. Urbs Chao king (prov. Quang tung). Multa odorifera ligna producit: *Aquilum* nimirum et illud quod Lusitani *Pao de Rosa* sen rosaceum vocant, quo ad capsulas, mensas, sedes, similiaque conficienda frequentissime utuntur, quoque vix aliud est praestantius, coloris ex nigro rubicantis, venis quibusdam, intercisum et artificiosa benigne obstetricantis naturae quasi manu depictum. (p. 137.)

Urbs Kiun cheu in insula Hai nan. *Aquila lignum* crescit in montibus, uti et *Ebenum*, *lignum Rosae*; et illud quod *Brasilum* vulgo vocant, quod ad tincturam per totam Sinam passim adhibent fullones. (p. 140.)

With respect to Eaglewood and Rose wood compare Semedo 8, note. The Ebony of China is probably yielded by the tree described in Loureiro's Fl. cochin. under the name of *Ebenoxylon verum*, but it seems that after Loureiro no botanist has had opportunity of observing it.—Brazil wood is *Caesalpinia Sappan* L. (Comp. Yule's M. Polo 2d edition II 260.)

32. Urbs Cin cheu (prov. Quang si). Ibidem arbor illa ferri est, buxo nostrate multo durior. (p. 146)—Urbs Chao king (prov. Quang tung). *Cao leang* mons prope *Te king* ex eo celebris, quod ingentes arbores, quae ferreas seu *lignum ferreum* vocant profert.

The mountain 高良 *kao liang* in the district *Te king chou*. The tree producing the Chinese Iron wood, sin: 鐵梨木 *t'ie li mu* seems to be unknown to botanists. Comp. Loureiro Fl. cochin. 326. *Baryxylum rufum*. There are probably several trees going under the same Chinese name. I have myself seen in Canton a red and a grayish green wood, both of them termed *t'ie li mu* and extremely hard.

33. Urbs Chu cheu (prov. Che kiang). Luyen (?) rivus prope King ning (景甯) magnis *Arundinarum* sylvis virens. Sinae eas communi nomine *Cho* dicunt, licet quam plurimae earum sunt species, Lusitani in India *Bambu* vocant, aliae aliis majores sunt. Harum omnium durities prope ferrea est, adeoque saepe crassae sunt, ut duabus tribusve manibus stringere nequeas: quamvis autem intus vacuae sint, suisque nodis articulisque distinctae, firmissimae tamen sunt, ac securissime imposita onera sustinent. Altitudo saepe trium aut plurium cannarum est, minores aliae mediam perticam haud excedunt, aliae sunt trunco ac ligno viridi, aliae nigerrimo, atque haec plerumque



solidae quales in India Bambu marem vocant. Amoenissimum adspexitum praebent tum folia oblonga forma gladioli, summatibus nonnihil inflexis atque incurvis: tum quia toto anni tempore virides sunt. Licet autem adeo durae sint arundines facile tamen in licia tenuissima, ac veluti membranulas ab artis peritis dissecantur, ex quibus storeas, capsulas, pyxides, pectines aliaque simili utensilia minutissima subtilissime contexunt. Ex eisdem domos suas facile construunt eisque par aedium minorum postibus utuntur; ex tenuioribus hastilia fiunt cuspide praeferata atque ad sexcentos alios usus, quorum nimis prolixa esset narratio adhibentur. Ad aquarum canales ductusve struendos, cum a natura perforatae sint, aptissimae sunt: ac protubis opticis longioribus ob levitatem, rectitudinem, crassitiem ac firmitatem excellentes prorsus ac singulares. Cum recens haec canna absecta comburitur, aquam emittit, uti ligna omnia, plurimum a medicis expetitam: epota namque putrescentem sanguinem locoque motum vel casu, vel percussione, e corpore expellit. Tenera ac primum nata, priusquam folia emittat cum carne adhibetur pro cibo veluti rapae, aut cocti cardui, quin et aceto macerata toto anno servatur tamquam condimentum, seu obsonium ad delicias, non secus ac minores apud nos cucumeres, aut foeniculum. (p. 116.)

Urbs Hoai gan (prov. Kiang nan). Ad urbis orientum est Hung lacus (洪澤) et palus ingens. In eo nascuntur *Cannae* illae palustres altissimae, quibus lignorum loco tota utitur regio. (p. 104.)

Urbs Hoi cheu (prov. Quang tung). In monte *Lo fou* (羅浮山) longissimae *Arundines* nascuntur caedem crassissimae, quae reliquas fere omnes superant, trunci circumferentia decem subinde aut plures palmos aequat aut etiam superat. (p. 136.)

竹 *chu* is the general term for Bamboo in Chinese. Munro in *Transact. of Linn. Soc XXVI* (1868) enumerates 12 species of *Bambusa*, known from China. It is not certain whether *B. arundinacea* Retz (*Arundo Bambus* L.) occurs in China.

34. Urbs Lui cheu (prov. Quang tung). In omnibus hisce terris vimen illud mirabile nascitur quod Sinae *Teng*, Lusitani *Rota* vocant, funem a natura contortum esse credas, in maximam enim longitudinem extenditur, ac veluti funis per terram ac montes prorepat; spinis horridum est, foliisque oblongioribus viret, crassitie vix digitum aequat, et tamen saepe ad integrum stadium diffunditur, tantaque per montes copia ut inter se intricatae stirpes etiam cervis iter impervium reddant. Lentissimum prorsus vimen est, maximeque fractioni resistit,



quamobrem ex eo rudentes, funesque pro navibus confieri solent; imo illud in licia vittulasque tenuissimas minutissime partiri solent, ex iisque corbes, crates, sedilia aliaque similia contexere, maxime vero subtilissimas ac molissimas illas storeas, in quibus Sinenses plerique ad ipsem Regem nudi, dum somnum capiunt, decumbere consueverunt, quae res mundissima est et aestate perfrigida, et Sinensibus, tametsi eae storeae vel nudis asseribus instratae sint, sat commoda videtur ob longam ita decumbendi assuetudinem. Ex iisdem viminibus ipsos lectulos efformant, ac pulvinaria, quae rebus quibusdam odoratis infarciunt ad delicias. (p. 139.) Vimen etiam seu Rotam tota insula Hainan profert. (p. 140.)

*Calamus Rotang*. L., *C. rudentum*. Lour., *C. verus*. W. *C. viminalis* W. and probably several other species, growing in India, the Archipelago and Cochin China furnish the Rattans so commonly employed for different purposes. As to the species of Southern China they are very imperfectly known, but some of the above mentioned species may occur also in China. The Chinese character 藤 *t'eng* denotes not only Rattans, but is also applied to other climbing plants.

35. Urbs Nien cheu (M. means Yen chou fu, prov. Chekiang.) Plurimum colligitur Gummi illius seu glutinis *Oie*, quod stillat ex arboribus, persimileque est lachrymae terebinthi. Aestate colligitur, purgaturque a Sinis, et quo volunt colore inficitur: optimum est quod aureo flavescit, proximum quod nigerrimum. Cum nondum siccatum est, venenatam quandam emittit exhalationem, cui non adsueti intumescunt ac pallent vultu, sed facilis est curatio. Cum tinguntur arculae tardius siccatur, nisi in humido sit loco, semel autem exsiccatum numquam amplius liquefit. Quam vero res fit elegans munda ac splendida jam pridem didicit Europa ex capsulis quae e Japonia atque ipsa Sina plurimae fuerunt advectae (p. 113.)

漆 *ts'i*, the famous Chinese *Lacquer*, yielded by a species of *Rhus*. The plant however has not yet been examined by botanists, with the exception of Loureiro, who has named it *Augia sinensis*. See also above *Semedo* 17.

36. Urbs Kin hoa (prov. Chekiang). Quod mihi hic saepe admirationem movit pinguedo quaedam est ex arboribus nata, ex qua veluti ac sebo optimae atque albae fiunt candelae, quae manus non inficiunt etsi tangantur, nec foetorem exhalant dum extinguntur. A Sinis *Kieu yeu* vocari solet. Arbor sat magna est, pyros nostrates et foliis et forma refert, florem album emittit, ut cerasi, florem excipit bacca rotunda omnino, ceraso mole aequalis; tegit hanc subniger et tenuis cortex, alba intus caro est, quae, cum bacca matura est, disrupto cortice apparet. Has baccas colligunt ac aqua calida excoquunt, tum caro liquefit, at frigida iterum omnino ut sebum solet, spissatur.

Nucleus dein remanet, hunc oleo plenum, ut olivas nos, macerant et oleum non ad cibos, sed ad lucernas aptum exprimunt. Hyberno tempore folia, quasi cuprea essent, omnino rubescunt; amoenus mihi horum foliorum saepe visus est conspectus, cum quasi integrae sylvae rubrae appareant: demum folia decidunt, et quia pinguedine quadam praedita sunt, gratissimum ovibus ac vaccis cibum praestant, ex quorum esitatione egregie pinguescunt. (p. 114.)

Martini's account of the *Tallow tree*, *Stillingia sebifera*. Mich., in Chin.

柏 *kiu* (the vegetable tallow is called *kiu yu*), is correct, with the exception of the description of the flowers. The tree is very common in Central and Southern China.

37. Urbs Tegan (prov. Hu quang). Est in hac regione rarum quid, *Alba Cera*, quae a vermiculis elaboratur eo fere artificio quo apes favos suos struunt. Sunt autem hi favi multo minores ac candidissimi, nec vermiculi culti sunt, aut domestici, sed inculti atque agrestes. Ex collectis favis candelas ut ex communi nostrate cera conficiunt, at longe magis albae sunt, a magnatibus, quod majori constant pretio, fere tantum adhiberi solent: nam praeter candorem odorem etiam suavem emittunt cum comburuntur, nihilque sordibus inficiunt aut foedant, licet guttae liquefactae in vestes incidant. Lumen etiam clarissimum, maximeque temperatum reddunt. (p. 76.)

Urbs Ping lo (prov. Quang si). In hujus urbis territorio reperitur *cera illa alba* ab animalculis illis insectis elaborata, de quibus supra dixi. (p. 145.)

This is it seems the earliest notice given by an European observer with respect to *Chinese Insect Wax* produced, as is well known now, by the *Coccus pela* Westw. living upon the branches of *Fraxinus chinensis* Roxb. and other species, and also on *Ligustrum lucidum* Ait. (See Hanbury's scient. pap. p. 60.)

38. On p. 108 and 88 of Martini's *Atlas sinensis* an account is found of the breeding of silkworms and the planting of *Mulberry trees* in the provinces of Chekiang and Fukien.

39. Urbs Iung ping (prov. Chi li). Magna ibi copia est nobilissimae radicis tota Sina celebratissimae *Ginseng*, Japonibus *Nisi*. Nomen sinicum illi a figura divaricatis quippe cruribus hominis formam refert (*gin* porro hominem significat.), *Mandragoram* nostratem credas, nisi quod ea multo minor sit, quin illius tamen species sit aliqua, nullus dubito, quippe quae et formam et vim habeat. Folia ejus mihi hactenus videre not contigit. Siccata radix flavescit, fibras seu capillos vix aut ne vix quidem habet. Cum manditur dulcedine ingrata est nonnulla admista amaritie, sed tenui. Anget plurimum vitales spiritus, suavem corporis calorem excitat. Fortioris calidiorisque

naturae qui sunt ejus sumptione vitae periculum adire solent nimium auctis exundantibusque spiritibus; debilibus, fatigatis, vel morbo diuturniori, aliave de causa exhaustis ad miraculum prodest. Moribundis ita vitales quandoque vires reddit. (p. 35).

**Panax Ginesng**, C.A. Mey., a plant now confined to Manchuria, not met with in the prefecture of Yung ping, as M. asserts. Yung ping fu is situated near the Manchurian frontier. It appears however from the ancient Chinese records that in former times Ginseng was gathered even in the mountains of North China. Comp. also Semedo ii.

40. Provincia Xensi (Shensi) multa praeclara suppeditat medicamenta, *Rheubarbarum* imprimis, quod non sylvestre est, ut putant quidam, sed diligenti culturae arte indiget. Sinae vulgo *Tai hoang* vocant. Radix est sat solida, tuberibus hinc inde prominentibus, foliorum forma haud ita procul abest a caulibus nostratibus, quos tamen magnitudine superant. Radices uno pertusas foramine in umbra suspendunt at siccant: nam in sole suspensae vim amittunt. Ex hac et Suchuen altera provincia, est magna ex parte *Rheubarbarum*, quod ad nos in Europam defertur, nimirum per mare indicum vel Cascar, Astracanam et Russiam vel per Tebet, Mogor et Persidem: nemo enim est magnopere rerum peritus (quod equidem sciam) qui in illis regionibus nasci *Rheubarbarum* velit, sed inde nos habere asserunt, quia ab illis affertur emiturque nationibus, et ex Sina allatum esse ignoratur (p. 43. 45).

M. is correct in stating, that Rhubarb in its native country is cultivated. Przewalsky reports the same. But it seems that the greater part of the drug collected for sale grows wild in the mountains of Si ning fu and those surrounding lake Kukonor. Comp. also above Semedo 10, note.—There is in Kircher's *China illustrata* (French ed. 1667) p. 249 an engraving representing the "*Rheubarbarum verum*." Kircher states, that this drawing has been made from a plant grown in the garden of Mr. Juste Nobelar in Leyden at the time when Father Martini, in June 1654 passed through this city. He then had declared, that it was the true Rhubarb of China. But at the time here spoken of *Rh. rhaponticum* L. was the only Rhubarb known and cultivated in European gardens, and Kircher's drawing seems indeed to represent this species.—Dapper in his *Description of China* 1670 (see further on) gives a good drawing of a Rhubarb plant, which he terms *Rhabarbarum Witsoniarum*. I know nothing about this name, but the plant represented seems also to be *Rh. rhaponticum*.—The Chinese name of Rhubarb is 太黃 *tai huang*.

41. Prov. Suchuen. Vera *Radix Sina* in hac provincia sola reperitur, sylvestris ubique, *Folin* utramque Sinae vocant, ac fere sola sylvestris ad nos affertur, cujus medulla rubicundiori colore quodammodo tincta est, ad verae autem magnitudinem non accedit, neque efficaces adeo habet vires, quamvis non omnino illius effectum careat. Vera autem uti dixi radix in hac sola nascitur provincia, idque sub ipsa terra, uti fere phalli

Hollandici (an ancient name for *Phallus impudicus*. L.) aut apud Indos Patatas nasci propagarique solent, maxime in annosis pinorum sylvis, und eam ex glutine seu pice pinea produci scribunt, quae in terram delapsa radices agat, atque herba fiat longo tractu per terrae superficiem serpens, continuoque tuberosas radices sub ipsa terra emittens subinde ad capitis puerilis magnitudinem, figura ac mole magnas nuces indicas, quas Cocos vocamus aequat, nec cortex colore abludit, quamvis non adeo durus crassusve sit, sed mollior omnino ac tenuior. Corticem replet nucleus seu caro alba ac spongiosa, hanc Sinae magni faciunt et in suis medicinis adhibent, tametsi cum hac carent, sylvestrem illam non respuant, at effectu non aequae bono. (p. 65.)

Martini's *Radix Sina vera* is a fungus which has been described under the botan. name *Pachyma Cocos* Fries. (Hanbury scient. pap 201, 267) in Chinese 茯苓 *fu ling* or 白 | | *pe fu ling*, i.e. white *fu ling*; whilst his *Rad. Sina sylvestris* is to be referred to *Smilax China* L. and other species yielding the drug we call China root and the Chinese 土 | | *tu fu ling* i.e. common *fu ling*. Martini at first distinguishes the two plants but in the description confounds them.

42. Urbs Hang cheu (prov. Che kiang). Ex monte Tien mo infinita vis *Fungorum* per totam Sinam defertur, quos sale conditos exsiccant (p. iii).

The 天目山 *T'ien mu* mountain is situated N. W. of Lin an hien.

43. Urbs Kiun cheu in insula Hainan. Est herba quam *Chi fung*, seu ostendentem ventum nominant. Nautae enim ex illa quo mense, et quot toto anno futurae sint tempestates, colligere se posse asserunt, idque ex nodulis seu geniculis ipsius; quo enim nodi pauciores sunt, eo pauciores illo anno futurae sunt tempestates, ex distantia autem nodorum a radice scire, aut colligere posse se autumnant, quo mense accidere tempestas debeat. (p. 140)

The plant 指風 *chi feng* is noticed in the Chinese Botany Kuang kün fang p'u XCII fol. 24.

44. Urbs King chou (prov. Hu quang). Hic reperitur *Herba* quam mille annorum vocant quin et immortalem esse scribunt. Haec aqua macerata, ac epota albos crines in nigros commutat atque ad vitam producendam conducit. (p. 77.)

千歲藟草 See the great geography Yi t'ung chi sub King chou.

45. Urbs Cung chang (prov. Xen si). Ad Cin civitatem in Po chung monte herbam nasci scribunt *Hoa co*, quae comesta steriles reddit. (p. 50.)

The Yi t'ung chi notices the plant 花骨 *hua ku* on the mountain 蟠冢山 in 秦州.



46. Urbs Ching yang (鄢陽, prov. Hu quang.) Stirps quaedam hic nascitur quae ut *Hedera* nostra in altum serpit, flores producit luteos et nonnihil albicantes. Extremitates ramorum subtilissimae sunt, velut fila serica: ajunt ramusculum nudae carni allegatum somnum suavissimum conciliare, ideoque *Mung hoa* dicitur i.e. somnii flos (p. 82.)

I have not been able to find the 夢花 *meng hua* noticed in Chinese works.

In the year 1656 a treatise was published at Vienna under the pretentious title of **FLORA SINENSIS**, the author of which was Father **MICHAEL BOYM**, a Pole, born in 1612. He left Europe as a Jesuit missionary for China in 1643, returned to Europe (Lisbon) in 1652, reembarked for China in 1656 and died in the province of Kuang si in 1659.

The original work of Boym's *Flora sinensis* published in Latin is a very rare book. I have seen it in the great Vienna library. It is issued in folio, *Viennae Austriae, typis Matthaei Rictij*, 75 pages with 23 engravings. Several prefaces, dedications and poetical essays occupy a considerable part of the book, which has no claim to research into Chinese botany, as the name of the treatise would seem to indicate. Boym gives an account of 22 plants, of which more than one half are rather plants of the Indian Archipelago. 21 of them are represented by tolerably well executed engravings and the Chinese characters added to the names. The *Flora sinensis* is followed by an account of some Chinese mammals, birds, reptiles etc with 2 engravings. The book concludes with an appendix on the Inscription of Si an fu. Boym's *Flora sinensis* has been translated into French by Bayer and appeared also in Thevenot's *Relation des Voyages*. 1696 sec. partie p. 15-30. The greater part of the engravings have been reproduced in Kircher's *China illustrata* and in Dapper's *Description of China* (see further on.)

I shall give in the following pages a list of the plants described by Boym, reproducing occasionally the original text or a part of it.

1. *Yuy cu* 椰子. *Palma persica et indica seu sinensis, vulgo Coco vel Nux Indorum.* (no engraving.)

2. *Pim lam* 檳榔. *Fructus Areca et Bethel folium.* (no engraving.)

Drawings representing the *Areca* palm and *Betel* pepper are found in J. Bontius, *Historia natur. et med. Indiae orient.* (1629.) p. 90. 91.

3. *Fan yay xu* 反椰樹. *Arbor Papaya* in India dicitur, copiose in Sinarum Haynan insula progignitur nec non in Iunnam, Quamsy, Quamtum, Focien, australibus provinciis.



The first character in the Chinese name is evidently wrong. In the Chin. Botany *Chi wu ming shi t'u k'ao* XXXI, fol. 54, *Carica Papaya* L. is represented in a drawing and termed 番瓜樹 *fan kua shu* (foreign melon tree). A drawing of it is also found in Bontius l. c. 96.

4. *Pa cyao xu* 芭蕉樹. *Ficus indica* et *sinica*. Integro anno fructus iste reperitur in Indiis et apud Sinas in regnis australibus. In Brasilia fructus vocatur **Banana**.

5. *Kia giu* (sen *Ka giu*) *xu* 欖如樹. Fructus indicus, apud Sinas non reperitur, verum in regnis quae Sinarum olim fuerant abundanter provenit et crediderim allatum in Iunnam et Quamsi posse produci. Arbor est magna foliis pulcherrimis et semper virentibus. Fructus imitatur pomum flavum vel rubicundum, ubi maturescit odoriferum, verum pomi succus agrestis est, et caro si comedatur guttur mordet. Fructus nullum semen habet, sed in vertice illius ad instar nuclei prominet, quem cortex glaucus, albam carnem et solidam recondens, instar castaneae vel amygdalae nucis cooperit, saporem earundem si elixetur referens. Indi et Lusitani nucleis dictis loco amygdalarum utuntur.

The above description and the accompanying drawing of the fruit leave no doubt that *Anacardium occidentale* L. is meant. The Chinese characters render, it seems, the Indian name of it, being *Caju* (Watson names of Indian plants etc.). Comp. also Loureiro 304, Bontius l. c. 193.

6. 7. *Lici* 荔枝 et *Lum yen* 龍眼 fructus. **Nephelium Litschi**. Camb. and **N. Lungan**. Camb. (V. supra Martini 7.)

8. *Giambo* 攘波. Fructus duplicem habet speciem, nam et rubri et albi coloris in India, subflavi rosarum fragrantium redolens odore in Malacca, Macao et Sinarum insula Hiam-xan reperitur. Prior species florem purpureum, posterior alboflavum habet. Folia pulcherrima laevia ac uno palmo longa triumque digitorum lata. Fructus ipse magnus plane sicut pomum, frigidissimae qualitatis.

Boym describes two species of the Rose-Apple, *Jambu* in India, viz: *Eugenia malaccensis*. L. (purple flowers) and *E. Jambos*. L. (yellowish white flowers). The fruit is well represented by the drawing.—The island Hiang shan is situated north of Macao. *E. Jambos* is naturalized in Hong-kong (Bth. fl. hong. 120.)

9. *Fun polo mie* 反波羅密. **Ananas** fructus in australibus regnis Quantum, Quamsi, Iunnam, Focien et insula Hainan provenit abunde. Ad Indias orientales ex Brasilia dicitur fuisse apportatus.

The first Chinese character is again wrong and is to be read 番 *an* (foreign).

10. *Manco* (Chinese characters illegible). In australibus terris producitur uberrime.

A good description and drawing of *Mangifera indica*. L. Compare also Bontius l.c. 95.

11. *Pi pa* 枇杷.

*Eriobotrya japonica* Lindl.

12. *Cieu ko* 臭果 seu *Goyava* fructus. In provinciis australibus apud Sinas.

The Chinese characters mean: stinking fruit. Indeed the scent of the fruit of *Psidium Guyava* L. when too ripe is unpleasantly powerful. According to Dr. Williams in Bridgm. Chrest. 443 (18) the Chinese name of the Goava is 鷄屎果 *Ki shi kuo*, meaning: fowls dung fruit. Under the latter name it is represented in the *Chi wu ming* etc. XXXI 49.

13. *Po lo mie* 波羅密 seu *Giacca* ab Indis dictus fructus.

*Artocarpus integrifolia*. L. Jack fruit. Compare above Martini ii. The Chinese name *po lo mi*, under which it is also represented in the *Chi wu ming*, XXXI 44. is apparently a transcription of the Sanscrit *paramita* (excellence).

14. 柿餅 *Su pin*. Fructus sinicus. Arbor et fructus apud Sinas tantum nascitur, est aurei et purpurei coloris magnus, pomum excedit, carnem mollem ac rubeam cum simili pellicula refert, ossicula hinc inde interius abscondit. Cum siccatur ficibus Europaeis simillimus est et per multos annos conservatur. In Quamtum et Fokien regionibus Januario, Febuario, sed in Xensi et Honan aliisque septentrionalibus Junio, Julio et Augusto maturescit.

*Diospyros Kaki*, L. v. supra Semedo 4. The Chinese name given by Boym properly denotes the dried fruit, for the second character means cake.

15. *Ya ta au* 亞大樹. Fructus *ya ta* in Indiis et popotissimum agro Malacensi reperitur, qui Sinis olim tributum pendebat, ideoque sinicus fructus optime dici potest et quod etiam in sinense solum translatus uberrime germinet. Viridem corticem et piniferum habet, sed interius carnem liquidam nivis ad instar albam, sapore superat dulciarium, quod Lusitani appellant mangiar reale. In multis cellulis ossicula nigra solida recludit. Alicubi Octobre et Novembre, alicubi Febuario et Martio mensibus maturescit.

The drawing given by Boym of this fruit represents *Anona spumosa* L. By *ya ta* (*a ta* in the Southern dialect) the Singhalese name of it, being *atta* (Watson l.c.), is rendered. At Canton the Chinese call it *fan li chi*, foreign Li chi (Bridg. l.c. 443 (10)).

16. *Du li am* 土利? Fructus hic in Java, Malaca, Macaca (vulgo Celebe.) et Siam regnis ac insulis olim tributariis Sinarum reperitur. Caro illius alba. Sicca caro fructus instar lactis coagulati in alias partes deportatur venalis, quae nucleum interius ad modum albuminis ovi cooperit.

This is the famed *Durian*, *Durio Zibethinus*. L. a tree of the Indian Archipelago and Siam. I do not think that it is cultivated in Macao as Grosier (la Chine II. 539.) reports. It seems to me that Grosier, who

refers to Boym, took *Macaca* mentioned by the latter to be Macao. But *Macacas* is an ancient name for Macassar (Crawford Dict. Ind. isl. 90.). Bontius l. c. 118 seems to confound the Durian with the Jack fruit, at least he gives Durian and Jaca as synonyms. His drawing of the fruit could be referred to the Jack as well as to the Durian, it does not represent leaves.

17. *Innominatus Fructus*. Illius nominis sinici non memini. Vidi illum primum in insula Hainan et postea in provincia Quantum. Arbor procera, folia maxima, quae medium hominem contegere possunt, producit. Hoc admirabile habet, quod media radice telluri inhereat, ex alia autem parte radice patente flores rubros et simul fructus, similes Europaeis ficibus progenerat, qui cum maturescunt, rubent paululum; sed interior caro et sapor illorum figuram et saporem ficium repraesentat. Julio et Augusto maturescunt.

It would seem from this description and the drawing accompanying it, that *Cynometra cauliflora* L. is meant, a tree of the Malayan Archipelago, which I have seen myself in Java. The fruits of it grow on the stem or about the roots.

18. *Hu cyao* 胡椒 *Piper nigrum*. L. (v. supra Martini 22.)

19. *Fo lim* 茯苓 *Radix Siniae* (v. supra Martini 41.)

20. *Tay hoam* 太黃 *Rhabarbarum* (v. s. Martini 40.)

21. *Quei pi* 桂皮 *Cinnamomum* (v. s. Martini 21.)

22. *Sem kiam* 生薑 *Zingiber*.

A good drawing of Chinese Ginger is found also in Bontius l.c. 189.

As the late D. Hanbury has proved in the introduction to his Notes on Chin. Materia medica, the treatise, which is generally quoted under the name of **CLEYER'S SPECIMEN MEDICINAE SINICAE**, published in 1682, consists of translations from Chinese medical works by Father Boym. They were only edited by *Andreas Cleyer*, a physician in the service of the Dutch E.I. Comp., well known as the first European botanist, who studied the Flora of Japan. One section of the specimen medicinae sin. of 30 pages, is entitled: *Medicamenta simplicia quae a Chinensibus ad usum medicum adhibentur*. It is nothing more than an enumeration of 289 Chinese drugs, for the most part of vegetable origin, giving the Chinese name of each written according to the Portuguese orthography, without the Chinese characters. The medical properties of each drug according to the Chinese ideas, are explained. In some cases the author adds the European name. Although the greatest part of these drugs can now be ascertained from the Chinese names added, the treatise is altogether devoid of interest and may be quoted only as a bibliographical curiosity.

In the same year, 1655, when Martini's *Novus Atlas Sinensis* was published in Europe, the Dutch E. I. Company sent an embassy to Peking and appointed *Goyer* and *Keyser*, two merchants of Batavia, as envoys. **J. NIEUHOFF**, who accompanied them as steward of the mission, published ten years later a work under the title: **LEGATIO BATAVICA AD MAGNUM TARTARIAE CHAMUM SUNG TEIUM,\* SINAE IMPERATOREM**. Amst. 1665. It is illustrated by a great number of engravings representing views, plants, animals and other things relating to China, and has been translated into several European languages. This book may well stand as a model of the most impudent plagiarism and imposture in the literature of travels in the 17th century. As N. quotes no previous books on China, the reader cannot but suppose that all the rich information he furnishes with respect to that Empire, had been gathered by himself in China. But in reality it is only the diary of the embassy's journey from Canton to Peking, partly by land and partly by river and the Grand Canal, which N. can claim as his property, and there is nothing in it to boast of, for the whole narrative abounds in errors and intentional misrepresentations. As far as I can judge the drawings in this work, representing Chinese scenery, are all pure creations of fancy. The cities and villages of North China, through which they passed, appear there as overshadowed by lofty Cocoonut trees, and even Peking, of which a large view is given, with the great wall close behind the city, has not been exempted by the artist in this respect. As to the rest of the accounts found in this work, they are a reproduction of Martini's valuable *Atlas sinensis*, and that is precisely the case regarding the chapter dealing with Chinese plants, animals, etc. The engravings representing plants have been borrowed from Bontius and Boym. Some of them seem to be the production of the artist's imagination.

In 1670 Dr. **DAPPER**, published in Dutch a **DESCRIPTION OF THE CHINESE EMPIRE**, appended to his narratives of the second and the third Dutch embassy to the Chinese Court, in 1662 and 1666-1668. This is also nothing more than a translation of the *Atlas sinensis*, often misunderstood, undigested and indigestible. Nearly twenty pages in it are devoted to the Botany of China. The greater part of the drawings of Boym's *Flora sinensis* are here reproduced and, of course, no sources are adduced.

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\* Emperor *Shun chi* 1644-62.



There is another well known ancient work on China, **KIRCHER'S CHINA ILLUSTRATA**, published in 1667. This has also little claim to originality. The author, who had never been in China, draws from Martini (who had been his pupil,) Boym, and the writings of other missionaries, but he quotes honestly his sources and compiles with criticism, displaying a great knowledge of the subject he treats of. *Athanasius Kircher*, a German, born in 1601+1680, was also a Jesuit, at first Professor at Würzburg; he subsequently resided in Avignon and in Rome.

After Boym the next Jesuit missionary in China I have to notice as a writer on matters of natural science is **GABRIEL DE MAGALHAES**, a Portuguese. He was born in 1609, arrived in China in 1640, died at Peking in 1677. He is the author of a work entitled: **NOUVELLE RELATION DE LA CHINE**. The original M.S. was in Portuguese. It was translated into French and published in 1668. On p. 173 we find an interesting account of the Chinese White Wax, *pe la* (白蠟), produced by insects in the provinces of Shan tung and Hu kuang, and of the trees on which these insects use to live. Compare above Martini 37.

Some remarks on Chinese plants are found also in **LE COMTE'S NOUVEAUX MEMOIRES SUR L'ETAT DE LA CHINE**. Paris 1696. 2 vol.

*Louis Le Comte*, a Frenchman, born in 1655, joined the Jesuit mission in China in 1687. He died in Bordeaux, in 1729.

1. We learn from Le Comte (I. 173.) that the first *Orange* tree, which had been introduced by the Portuguese from China, then (i.e. at the end of the 17th cent.) still existed in the garden of Count St. Laurent in Lisbon.

It is known, that the sweet Orange, now extensively cultivated in Southern Europe, was unknown there before the middle of the 16th cent., when it was introduced by *Juan de Castro*. It is in allusion to its Chinese origin, that the orange in Dutch is styled *Sinaas appel*, and *Apfelsine* in German.

2. Le Comte saw in the province of Shensi a kind of small yellow *Melon*, which the Chinese eat, without peeling off the skin. He notices also Melons the same in size as those cultivated in Europe and large *Watermelons* with red or white pulp (I. 132.)

An excellent globular Melon of the size of a small fist with a thin skin is also seen in Peking and known there under the name of 甜瓜 *t'ien kua* or 香瓜 *hiang kua*. The peel is yellow, or in another variety green. Loureiro, Fl. cochin. 726, speaks of Melons of large size in Southern China. I have not seen large Melons in Peking.



3. A good description of the *Tea plant*, its culture, etc., in the Province of Fokien is found I. 368. The author explains that the Chinese call the plant properly *Cha*, and that only in the dialect of Fokien the name sounds *Te*.

4. Le Comte reports that *Tobacco* is cultivated near Peking and in the provinces of Shansi, Shensi, Sz'ch'uan. (I. 168.)

Le Comte seems to be the first European, who notices Tobacco in China. It is now a well established fact, that Tobacco was first introduced into China through the seaports of Fukien at the end of the 16th or the beginning of the 17th cent.

5. Le Comte speaks (I. 178) of a peculiar Chinese *Onion* in the following terms: J'y ai vu une espèce d'oignon qui ne vient point de graine comme ceux d'Europe, mais à la fin de la saison on voit sortir de petits filamens sur la pointe ou sur la tige des feuilles, au milieu desquelles se forme un oignon blanc semblable à celui qui germe dans la terre. Ce petit oignon pousse avec le temps des feuilles comme celles qui le soutiennent, lesquelles à leur tour portent un troisième oignon sur leur pointe, de manière néanmoins que leur grosseur et leur hauteur diminuent à mesure qu'ils s'éloignent de la terre.

This seems to be the same onion as that described under the name of 樓子葱 *lou tz' ts'ung* (onion growing in stories) in the 救荒本草 *kiu huang pen ts'ao*, published at the end of the 14th cent; a good drawing of it is also given there. The description states that at the top of the leaves grow from 4 to 5 little onions and on these again other onions are produced constituting thus from 3 to 4 stories. These onion plants do not bear seeds.—We have here probably to do with a so-called viviparous variety of an Onion. *Allium Cepa*, *A. scorodoprasum* and other species show sometimes the peculiarity of their flowerstems being surmounted by small bulbs, instead of bearing flowers and seeds. These bulbs produce new plants.

6. The *black* and *yellow Peas*, to which Le C. refers (I. 168) as used in North China for feeding horses, are: the yellow, **Soja hispida** Moench. (*Glycine Soja*), the black, a variety of it.

7. Le C. speaking of the *Peci* (***Eleocharis tuberosa***. Schult. v. supra Martini 14.) refers to Martini's statement, that when chewed together with a copper coin, the latter is easily bruised by the teeth, a story we met also in Chinese books. But Le C. refutes this assertion, appealing to his own experience. (I. 179.)

8. The tree is described which yields the *Chinese Pepper* or *hoa tsiao*. (I. 177.)

Several species of *Zanthoxylon* are included under the name of 花椒 *hua tsiao* in China. In Peking this name is applied to *Z. Bungei*. Planch.

9. Description of the tree *ou tom chu*, a large tree of the appearance of the Sycamore. It has large leaves with long leafstalks, the seeds of it are produced on the edges of leaves, different however in shape from the true leaves. (I. 268). There is also a good drawing of this tree.

This is *Sterculia platanifolia*. Cav. a common tree in China, sin: 梧桐樹 *wu tung shu*. Its carpel opens into green follicles indeed much resembling leaves, with the seeds attached to the edges of the follicles.

10. Le C. states that besides Cotton, the Chinese use to wear in summer clothes made from *Nettles* and another kind, they call *Co pou*, which is much esteemed by them. The latter is obtained in Fokien from a plant called *Co*, a shrub-like creeper, which they allow to grow over the fields, often extremely long. It has roundish leaves larger than those of the Ivy. They are soft, green on the upper side but covered on the under side with a coating of white down. The stem attains the thickness of a finger. To obtain the textile fibres they soak the stems in water, as we do in preparing flax, and after having removed the outer skin, they use the fibres of the inner bark for making linen, which is very fine, transparent and cool. (I. 242.)

*Pueraria Thunbergiana*. Benth. already noticed by Martini (v. supra M. 26). 葛 *ko* in Chinese.

11. Le C. devotes also some pages to the celebrated *Ginseng*, describing the plant and the mode of its use as a medicine (I. 377).

A great amount of useful information with respect to China is stored up in the *LETTRES ÉDIFIANTES ET CURIEUSES ÉCRITES DES MISSIONS ÉTRANGÈRES*, a collection of letters written by the ancient Jesuit missionaries to their superiors or friends in Europe. There are several editions of this collection. The most convenient for reference is that published in the *Panthéon littéraire*, of which the letters received from the Chinese and Indo-Chinese Missions constitute vol. III and IV.

The following names of Jesuit missionaries appear there in connection with reports on botanical matters in China.

**JOANNES LAUREATI**, an Italian, born 1666, joined the Chinese mission 1697, died 1727 at sea.

He wrote a letter, dated Fokien, July 26, 1714, to the Baron of Zea, in which he gives some accounts of the vegetable productions of China, especially of *Tea*. (Panth. lit. III. 225.)

In the same letter he notices, that the Chinese use the fibres of a *Nettle* for making clothes and speaks also of *Tobacco* which in the beginning of the 18th cent. was largely cultivated in Fukien. (l.c. 228.)

**FRANCIS XAVIER D'ENTRECOLLES**, a Frenchman, born 1662, joined the Chinese mission 1698, + in Peking 1741. Many interesting notes on China from his pen have been preserved. The following relate to Chinese plants:

Letter to Father Du Halde, dated Peking 7 Jul. 1727 (l.c. III 544.) This letter contains an interesting treatise on the manufacture by the Chinese of artificial flowers made from the marrow of a Chinese plant, called *tong tsao*, of which the author gives a description translated from a Chinese work.

This is the 通草 *t'ung ts'ao* of the Chinese, a plant which is not only used in making artificial flowers, but is also the source of the *Rice paper*, erroneously so called. It was only in 1852 that European botanists became acquainted with this plant, a native of Formosa. Sir W. Hooker described it in his Journ. of Bot., 1852 and 1853 as *Aralia papyrifera*. It has been introduced subsequently into many tropical countries. When I visited Java, in 1872, I saw it already, escaped from cultivation, growing luxuriantly in the forest surrounding the botanical garden of Tjibodas.

In the same letter (l.c. 547) d'Entr. says a few words on the large *Citron*, called *Fo shou* or Buddha's hand by the Chinese (v. supra Martini 10.)

In another letter, dated Peking 6 Oct. 1736 (l.c. III 713.) he treats of several other famed Chinese plants and begins first with some interesting and correct accounts of the tree and fruit, which the Chinese call *si tze* or *chi tze*. (**Diospyros Kaki** as has already been stated, v. supra Semedo 4, Boym 14.) He had observed the tree at Peking and sent also seeds of it to Paris. He states that the provinces of Shan tung, Ho-nan and Che-kiang are famed for their excellent sitze fruits, which are of various sizes, colors and shapes in different parts of China. They are generally of an orange or red color, but those of Chekiang are green even when ripe. Some varieties of this fruit have the appearance of two apples joined together or a fruit of two stories. The fruits on grafted trees are devoid of seeds.

The author here refers to the Peking variety of the Kaki, the largest in size, which near the basis of the fruit is provided with a circular depression and contains rarely seeds.

E. further states that the Chinese claim to graft successfully peachtrees on the sitze.

I have found the same statement in ancient Chinese works but cannot confirm it.

After this E. speaks of the *Lichi* fruits (v. supra Martini 7.) and then proceeds to describe a kind of *Acacia*, called *hoai shu* by the Chinese. Its fruit is used as medicine, the flowers for dying yellow.

This is the *Sophora japonica*. L., a very common tree all over China, sin: 槐樹 *huai shu*.

E. next translates from a Chinese book some notes with respect to *Willows*, explaining the use of willow wool instead of cotton.

The author means *Salix babylonica*. L., also a very common tree in China. This reminds me of a statement of Professor Bunge, who, in his *Enum. plant. Chinae bor.*, writes that the female tree of *S. babylonica* is very rare at Peking. This is an error. The female tree is met here much more frequently than the male and in May or June, when the willow seeds ripen, the air in the neighborhood of some places, where the trees abound, is full of this white wool (cottony down, which envelopes the seeds.) and d'Entrecolles reports the same. If I am not mistaken, in Europe the female tree only of *S. babylonica* is known. At Peking both male and female are met with.

In the same letter (l.c. 721) E. recommends, on the authority of Chinese authors, the roots of the *Belvédère*, *sao tcheou ts'ao*, termed *kiue* in Chinese books, as substitute for food in times of famine.

The author commits an error. What the French call *Belvédère* is *Kochia scoparia*. Schrad., a salsolaceous plant in North China as common as in Europe. The *Pen tsao kang mu*, XVI. 44. calls it 地膚子 *ti fu tsz'* or 掃帚草 *sao chou ts'ao* (meaning broom plant.) But the 蕨 *küe* (*Pen tsao* XXVII. 25.) is not the same, this name being applied to a Fern, *Pteris aquilina*. L., the farinaceous rhizoms of which are used in China as food as is also the case in some parts of Europe.

Finally (l.c. 722) E. gives an account of the Chinese *Camphor tree* and the method used by the Chinese to obtain Camphor from it.

**DOMINICUS PARENIN**, a Frenchman, born 1665, came to China 1698, + in Peking, 1741.

In 1723 Parenin sent a few Chinese drugs to the Academy of Sciences in Paris, furnishing some explanatory remarks on them in an accompanying letter. (l.c. III 341.)

The first of these drugs he calls *hia tsao tum chom*, meaning as he explains: a plant in summer, and in winter an insect. It is produced in Tibet and also in the province of Sz' ch'uan, and considered among the Chinese a very powerful medicine. The Father had himself experienced the medical virtues of this drug.

It is known now, that the drug in question is a Fungus, *Cordyceps sinensis*, which grows upon the head of a caterpillar.

The plant next described, the *san tsi*, is said to grow in the mountains of the provinces of Yün nan, Kui chou and Sz' ch'uan. This is still unknown to botanists. The plant 三七 *san ts'i* is treated of in the *Pen ts'ao* XII b. 41. The name



means: three and seven, and is explained by the distribution of the leaves.

After this P. gives some account of *Rhubarb*, and concludes by noticing an aromatic root, called *tam coue*, brought from Sz' ch'uan and much valued by the Chinese.

This is, it seems, the 當歸 *tang kui* of the Pen ts'ao, XIV. a 1. which is referred by Tatarinov with ? to *Radix Levistici chinensis*. I do not find this name in D.C. Prodr. It seems, that the Chinese plant yielding the drug *tang kui* is unknown to botanists.

In the same letter (l.c. III 345.) P. states, that during 18 years he had accompanied the Emperor Kanghi on all his frequent travels. As is known, Kanghi was an enthusiastic sportsman. His hunting expeditions were generally directed to Southern Mongolia and Manchuria. There were also other missionaries, who were associated with Parennin in these excursions. He mentions especially Dr. *Bourghese* and *Baudin*. The latter, a clever apothecary and botanist, had been ordered by Kanghi to search in the mountains for *Gentian* and *Imperatoria* (Masterwort.) in order to prepare the celebrated *Theriaca Andromachi*. But *Baudin* did not succeed in finding these plants.

There is no Masterwort in North China or in Southern Mongolia, but as to *Gentiana*, there are 5 species of it growing in the Peking mountains, some of them even employed as medicine by the Chinese. The Chinese name for *Gentiana* is 龍膽草 *lung tan ts'ao* (dragon's gall plant.)

P. gives finally in the same letter a slight sketch of the botany of the mountains of Southern Mongolia. Among the trees and shrubs there he mentions *Oaks* of a dwarf size, *Pines*, the *Aspen*, *Elm trees*, *Hazelnuts*, wild *Roses*.

The Tartars and Mongols, who inhabit these regions, do not cultivate any fruit. There are also very few wild fruits. Two of them are worthy of notice.

The fruit *oulana*, as the Tartars call it, is of the size of a great red cherry and is produced on a little stem, 3 or 4 inches high. The other fruit has the appearance of small raisins. It is produced in clusters on a fine tree, 25 and more feet in height. After the first frost these berries become red and are then of an acidulated sweet taste.

*Oolana* is the Mongol and Manchurian name for *Prunus humilis*. Bge., frequent in the mountains of North-China and Southern Mongolia. As to the other fruit mentioned, it is difficult to say, what is meant, for P. gives no native name. Perhaps he saw *Sorbus aucuparia*. L.

P. mentions further the following herbaceous plants he met with in these mountains; a fine *Angelica*, *Dictamnus albus*,



*Parsnip, Asparagus, Chelidonium, Potentilla, Agrimonium, Pimpernel* (*Poterium sanguisorba.*), *Pouliot* (*Mentha.*), *Joubarbe* (*Sedum.*), *Artemisia, Absinthium.*

I have adduced the preceding particulars merely on account of the length of time that has elapsed since their publication, for the botanical features of the regions Parennin traversed about 180 years ago, are well known now. We can therefore account for the plants he speaks of.

Finally I may mention, that Parennin was the first European, who notices the elegant **Wisteria chinensis** D.C., well known now also in our gardens. The climbing plant *ten lo hoa* he speaks of (see Grosier: la Chine III. 66.) in a letter to Father Du Halde, with violet flowers hanging down in large bunches, is without doubt *W. chinensis*, sin: 膝羅花 *teng lo hua*, growing wild and also much cultivated in North-China.

**PETRUS JARTOUX**, a Frenchman, born 1668, joined the Chinese mission 1701, † in Peking 1720.

We owe to this missionary a very valuable article on the **Ginseng** plant (*Panax Ginseng* C.A. Mey.) contained in a letter addressed to the Procureur général des Missions des Indes et de la Chine, and dated Peking, 12 April, 1711. (l.c. III. 183.)

The Fathers Jartoux and Regis had been intrusted by the Emperor Kanghi with the survey of Manchuria and the eastern part of the Great Wall, and on this occasion Jartoux had opportunity to visit the very country where the finest specimens of this famous plant grow, near the frontier of Corea. Jartoux describes the plant and the mode of its collection and preparation for the Emperor's use, and adds also a drawing of it made by himself from nature. Du Halde in his great work on China reproduces this drawing. Jartoux here gives the first authentic account of Chinese Ginseng. Lamarck in his *Encyclop. Botan.* II. 714 gives an abstract of this memoir.

**GASPAR CHANSEAUME**, a Frenchman, born 1711, joined the Chinese mission 1746, † in the province of Kiangsi in 1761. He has left an interesting memoir, written about 1750, and published in the *Panth. lit.* III. 830, on **Chinese Insectwax**. Ch. who speaks from his own observation made in the province of Hu kuang, gives some very valuable information regarding the insects which produce the wax, as well as with respect to the trees upon which they use to live. (Comp. above Martini 37, Maghellaes.)

Father **J. B. DU HALDE**, in his admirable and comprehensive work: **DESCRIPTION DE L'EMPIRE DE LA CHINE**, published 1735 in French, and

translated into many other languages, devotes several chapters to Chinese Botany, viz: I 16-27 Fruits, trees, flowers, economic plants; II. 64. On Chinese Agriculture and the Cereals of China; II. p. 143-153. On the abundance of several productions in China. Finally, there is in vol. III 378-509 a long treatise on Chinese medicine, all translations from Chinese medical works, especially from the *Pen ts'ao kang mu*, the well known Chinese book on Natural History and Materia medica. We find there several descriptions of Chinese medicinal plants. According to Le Comte (I 368.) these translations are due to Father Visdelou, one of the most distinguished sinologues. (Born 1656 in France, joined the Chinese mission 1687, + in India 1737.)

As Du Halde has drawn all the information. brought together in his work, from the letters of the Jesuit missionaries, we meet in it most of the matter preserved in the *Lettres édifiantes*. He never quotes his sources, but gives in the preface a list of the names of the missionaries, who have contributed to the compilation of the work. I need not mention that Du Halde had never visited China. He was himself a Jesuit and it seems that he made use of many letters, which the missionaries in China addressed to him and which are not included in the collection of the *Lettres édifiantes*.

In the sequel I give a list of the Chinese plants spoken of in Du Halde's work, supplying the botanical names as far as these plants are known to me. I quote from the original French edition.

The fruit *Tsetse* (I. 16.) is *Diospyros Kaki*. (v. Semedo 4, Boym 14.) Oranges, Citrons, Lemons (I. 16 and II. 143.)

*Litchi* and *Long yen* (I. 16.) *Nephelium Litchi* and *N. Lungan* (v. Martini 7.)

*Pampelmoose. yeoutse* (I. 16. 17). *Citrus decumana*. L. (v. Martini 9.)

The fruits *Tcin lan* and *Quang lan*, resembling our olives (I. 16. 17.) are *Canarium Pimela*. Koen. sin: 青欖 *ts'ing lan*, and *C. album*. Räush. sin: 橄 | *kan lan*.

The *hoa tsiao*, Chinese Pepper (I. 17.) is *Zanthoxylum* (v. supra Le Comte 8.) I do not know what is meant by "arbre qui produit des pois" (I. 17.) perhaps *Robinia* or *Caragana*.

Some interesting particulars with respect to the Chinese Varnish tree, *Tsi chu* (I. 17, II. 174.) Comp. also above Martini 35.

In the Phil. Trans. vol. XXII. p. 525. (1700) is an article: On the way of making China Varnishes sent by the Jesuits in China to the Grand Duke of Tuscany, communicated by

Dr. W. Sherard, the well known botanist, who is said to have gained this information whilst in Rome with his pupil, the Duke of Beaufort.

The tree *tong chu*, with fruit resembling walnuts and containing a poisonous oil, used for painting, (I. 18.) is the *Aleurites cordata*. Müll. (*Elaeococca verrucosa* Adr. Juss., *Vernicia montana*. Lour.) sin: 桐樹 *t'ung shu*.

The Tallow tree (I. 18, II. 143.) v. supra Martini 36.

The *pe la chu* or Wax-insect tree. (I. 18.) Martini 37. sin: 白蠟樹 *pe la shu*.

The *tchou tze* or Bamboo (I. 19.) sin: 竹子 *ch'u tsz'*. Martini 33.

The *cha mou*, yielding an excellent timber wood (I. 19.) is the *Cunninghamia sinensis*. R. Br. sin: 沙木 *sha mu*.

The *nan mou*, a precious timber wood, much used for building the Imperial palaces (I. 19.) is, as my friend, Father David, kindly informed me, a species of *Laurus*. He saw the tree in Sz'ch'uan.

The *tse tan* or Rose wood, the *tie ly mou* or Iron wood (I. 19.) 紫檀 *tsz' t'an*, a heavy precious wood, much used for furniture. The tree which produces it seems to be unknown to botanists. With respect to Iron wood comp. above Martini 32.

The Tea plant (I. 20.)

The tree *tcha yeou*, the fruit of which yields an oil (I. 22.) is the *Camellia Sasanqua*. Thbg. (*C. oleifera*. Abel.) The oil, styled Tea oil by Europeans, is 茶油 *ch'a yu* in Chinese.

The flower *mo ly hoa* (I. 23) is *Jasminum Sambac* L. v. supra Martini 19.

The tree *kuey hoa*, with fragrant flowers (I. 22.) is *Olea fragrans*. Thbg. v. supra Martini 20.

The flower *lan hoa* or *lan wei hoa* with unornamental yellowish but very fragrant flowers (I. 23.) is *Cymbidium ensifolium* Sw., in Chin: 蘭 *lan* or 蘭蕙花 *lan wei hua*.

A tree called *ouen koang chu* in Peking, with white flowers, and fruits with the appearance of a peach, but containing large black and hard seeds. (I. 23.). This is *Xanthoceras sorbifolia*. Bge. sin: 文冠樹 *wen kuan shu*.

*Lien hoa* (I. 24.) *Nelumbium speciosum*. W. (Martini 16.).

*Pe tsi* (I. 24.) *Eleocharis tuberosus*. Schult. (Martini 14.)

A peculiarity of the Chinese Cabbage, *pe tsai* is noticed, (I. 24.) which does not form heads like European Cabbage. This is *Brassica chinensis* L. sin: 白菜 *pe ts'ai*.

Rhubarb, the *Fou ling* and the *Pe fou ling* (I. 25.) v. supra Martini 40, 41.

I suppose, that by the medicinal herb *Fen si* described on the same page, the 防己 *fang ki*, Pen ts'ao XVIII b. 23, is meant. The Chinese plant of this name is however unknown to botanists. In Japan these characters denote *Menispermum acutum*. Thbg.

Another medicinal plant *Ti hoang*, of the province of Honan, is mentioned on p. 26. This is *Rehmannia glutinosa*. Lib. very common in the neighborhood of Peking, sin: 地黃 *ti huang*. According to Cibot: Mém. conc. Chin. V. 498 the root of it yields a yellow dye.

With respect to *san tsi* (p. 26.) see above the account given by Father Parennin of this plant.

The tree with long pods, *tchang ko tse chu*, *Cassia fistula*, in the province of Yünnan (I. 26.) 長果子樹.

*Cannelle Chinoise* (*Cassia bark*) in the province of Quang si (I. 27.) v. supra Martini 21.

The plant *Tien*, used as a blue dye (I. 27.) is *Indigofera tinctoria*. L. sin: 靛 *tien*. But *Isatis indigotica* has the same name.

The Cotton plant (II. 147.)

The *kou chou* is a tree, which has much the appearance of a fig tree. It contains a milky juice. Its leaves are divided into irregular lobes. The juice is used by gilders (II. 148.)

This is *Broussonetia papyrifera*. Vent. in Chinese 穀樹 *ku shu* or 楮 *ch'u*. Du Halde does not mention the principal use of this tree in China, a very strong paper being manufactured from its bark.

On the same page a much detailed but very obscure description is given of a tree called *lung ju cu*, the fruit of which has a peculiar stone containing an almond-like kernel. It seems to me that the first syllable of the name is wrong and we should read *kia ju tsz'*, which according to Boym is the Chinese name for *Anacardium occidentale*.

*Mo lien*, a large tree with large deciduous leaves. It puts forth its conspicuous lily-like flowers before the leaves; some trees have red, others white or yellow flowers (II. 149.)

木蓮 *mu lien* or 木蘭 *mu lan* is the Chinese name for *Magnolia obovata*. Thbg.

*Lamoë*, a tree with opposite leaves and yellow, very fragrant flowers, which the tree puts forth in winter (II. 149.)

*Chimonanthus fragrans*. Lindl. v. supra Semedo. 12.

*Ou tong chu* (II. 149). *Sterculia platanifolia*. Cav. v. supra Le Comte 9.



The *tcha hoa* (II. 149.) is *Camellia japonica*. L. sin; 茶花 *ch'a hoa*.

Description of a peculiar tree called *tse song* or *yuen pe*. Some of its leaves are prickly and resemble those of the Juniper tree, whilst other branches of the same tree present Cypress leaves. (II. 150).

This is *Juniperus chinensis* L. a large tree, which shows indeed the above mentioned peculiarity. Scale-like closely appressed leaves or linear spreading ones occur in different parts of the same tree. Its Chinese name is in Peking 刺松 *tsz' sung* (prickly pine). The name 圓栢 *yüan po* is applied to a different coniferous tree, according to Chinese books.

On the same page begins a long treatise on *Ginseng*, for the greater part a reproduction of Jartoux's memoir. It is accompanied with the drawing of the plant made by Jartoux.

Among the Chinese medicinal plants noticed in the 3d vol. of Du Halde's work, there is only one the name of which appears for the first time in the records of the Jesuits. On p. 496 is an account of certain *Galls* call *ou poey tse* and produced upon a tree *yen fou tse*. These galls are used by dyers to produce a black color.

As is known now,—these galls constitute a regular article of commerce—the tree or shrub on which they are, found is *Rhus semialata*. Murr. Sin: 鹽欏子 *yen fu tsz*. The galls are termed 五倍子 *wu pei tsz'*.

Du Halde's work is illustrated by eleven engravings representing Chinese plants. He does not quote the sources of these drawings but from comparison I have been able to trace them.

1. The *Bamboo*. (taken from Niewhoff, resp. Bontius.)
2. The *Sugar cane*. (Niewhoff.)
3. The *Lichi tree*. (Boym's *Flora sin.*)
4. *Artocarpus incisa*. L. (Niewhoff, resp. Bontius 119.)
5. *Betclpepper* (Niewhoff, resp. Bontius. 91.)
6. The *Cotton plant*. (Niewhoff.)
7. The *Ginseng*. (reproduced from Jartoux's original delineation.)
8. *Fouling, Radix China*. (Boym's *Flora sin.*)
9. The *Rhubarb plant*. (Kircher's *China illust.*)
10. *Ou tong chou, Sterculia* (Le Comte.)
11. The *Tea plant* (Niewhoff.)

Having brought down thus far my review of the observations made by the ancient Jesuit missionaries with respect to



Chinese plants, I must in the meantime leave the learned Fathers, and, to lay down in the order of time my material for a history of botanical discoveries in China, devote a chapter to an English naturalist, who in the very beginning of the 18th century visited China. In another chapter I shall have to speak of some Swedish travellers and naturalists, who half a century and more later, collected plants in the neighborhood of Canton or left accounts of their botanical observations in China.

## II JAMES CUNNINGHAM 1702.

Eleven years after E. Kaempfer had studied the Flora of Japan and brought home from that country about 500 plants, **JAMES CUNNINGHAM**, an Englishman, had the opportunity of investigating the Flora of China at several points in the Empire. He has the merit of having been the first European, who made botanical collections in China and whose rich herbarium safely arrived home, where it was described by several distinguished botanists of that time. The only biographical particulars I have been able to gather with respect to Cunningham are: that in 1698 he was sent to China as a physician to the English factory at *Amoy*. He visited also the island of *Chusan* and was subsequently transferred to the island of Pulu Condore, where the English had also established a factory. The publisher of the Philosophical Transactions styles him F. R. S. Besides his botanical collections made in China, he had sent also to England a few plants from the island of Ascension, gathered on his way to China. Comp. Pultney's historical and biographical sketches of the progress of Botany (1790) II. 58—and Sprengel's *Geschichte der Botanik*, II. 79.

In the Philosophical Transactions of the year 1702, vol. XXIII. p. 1201. sqq. two of Cunningham's letters treating of China and addressed to the editor of that Journal, have been published. As they are not very long, I shall reproduce them here, adding occasionally some explanatory notes. An abstract of these letters has already been given in vol. ix. p. 133 of the *Chin. Repository*.

It appears from the first of these letters that the ship in which Cunningham came out to China proceeded directly from England to *Chusan*. He does not allude in his letters, both written in 1701, to his stay at *Amoy*. But as among his *Chusan* plants described by Petiver we find also several noted as having been gathered on the island of *Emuy*, we can

conclude, that C. went from Chusan to Amoy in 1703. We know from the "New account of the East Indies" published in 1723 by Capt. Hamilton, that the factory at Chusan was commenced by the E. I. Company in 1700 and abandoned by the chief supercargo Mr. Catchpole in 1703 by reason of the exactions of the Chinese government and the Company's neglecting to send money.

#### CUNNINGHAM'S LETTERS ON CHINA.

The first of these letters bears no date. It seems to have been written in October 1701 (but perhaps in 1700). It reads as follows :

Sir ! My last to you was from the island of Borneo, in which I gave you an account of our arrival there the 17th July, where we staid but two days, the season of the year being so far past, and from thence made the best of our way through the Strait of Banca with favourable winds and weather, till we came on the coast of China the 13th of August. There we had variable winds which carried us abreast of *Emuy* the 19th following, at which time the north east winds setting in fresh, put us in great fears of losing our passage : whereupon we were forced to turn it up against wind and current all the way, the weather so favouring us, that we were never but by our topsails, else we should have lost more ground in one day, than we could have gained in eight. The last of August we came to an anchor under the *Crocodile islands* both to shelter us from the bad weather and also to look for fresh water, not having recruited since we came from the Cape of G. H. There are three small islands lying in the latitude of 26 degrees, about 6 leagues from the river of *Hocksien* ; on two whereof we found very good fresh water with a convenient watering place on the south west side of the innermost of the three\*. By the assistance of a few Chinese fishermen we procured some fresh provisions from the mainland, because we did not reckon it safe to adventure ourselves thither, lest we should have been brought into trouble by the government there. While we lay here, on the 5th of September, we had a sudden short shift of the monsoon to south-west, the fury whereof others felt, in coming upon the coast of China at the

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\* There can be no doubt, that C.'s Crocodile islands are the *Dogs islands* of modern maps, south east of the mouth of the Min river on which Fu chou (or *Hok chiu* in the local dialect) is situated.

same time. The 8th of September we put to sea again, turning to windward night and day without all the islands, which are very numerous along this coast, to which we were all together strangers beyond Emuy, and the hydrography thereof is hitherto so imperfect, that there was no trusting to our drafts, which made our navigation somewhat more dangerous. However on the first of October we got into the latitude of  $30^{\circ}$ , where we came to an anchor near the land, until we found the way by boat to *Chusan*,\* about 12 leagues within the islands, from whence we had a pilot, who carried us safely thither on the 11th of October. Upon this island the Chinese have granted us a settlement and liberty of trade, but not to *Ningpo*, which is 6 or 8 hours sail to the westward, all the way amongst islands; this being the largest, is 8 or 9 leagues in length from E. to W. and 4 to 5 in breadth, about 3 leagues from that point of the mainland called Cape *Liampo* by the Portuguese, but *Khi tu†* by the Chinese. At the westend of this island is the harbour, very safe and convenient, where the ships ride within call of the factory, which is built close by the shore on a low plain valley, with near 200 houses about it for the benefit of trade, inhabited by men, whose jealousy has not as yet permitted them to let their wives dwell here; for the town where they are, is  $\frac{3}{4}$  of a mile further from the shore, environed with a fine stone wall, about 3 miles in circumference, mounted with 22 square bastions placed at irregular distances, besides 4 great gates, on which are planted a few old iron guns, seldom or never used; the houses within are very meanly built. Here the *Chumpeen‡* or governor of the island lives and betwixt 3 or 4000 beggarly inhabitants, most part souldiers and fishermen; for, the trade of this place being newly granted, has not as yet brought any considerable merchants hither. The island

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\* The island of *Chusan*, the largest of the group marked as *Chusan Archipelago* on our maps, is immediately opposite the mouth of the river on which *Ningpo* is situated. The Chinese call it 定海 *Ting hai*, which is properly the name of a district city on this island. 舟山 *Chou shan* (*Chiu san* in the local dialect) is an ancient name of it not found on modern Chinese maps. The island of *Chusan* is not to be confounded with *Port Chusan*, on the south-eastern coast of *Corea*, where *Ch. Wilford* collected plants about a quarter of a century ago.

† A long projecting promontory opposite *Chusan*, 岐頭 *K'i t'ou* of Chinese, *Ke tou* point of English maps.

‡ 總兵 *Tsung ping*, a general.

in general abounds with all sort of provision, such as cows, buffaloes, goats, deer, hogs wild and tame, geese, ducks, hens; rice, wheat, calavances,\* coleworts, turnips, potatoes, carrots, beets, and spinach; but for merchandize there is none but what comes from Ningpo, Hangcheu, Nankin and the island towns, some of which I hope to see, when I have acquired a little of the Chinese language.

Here also the *Tea* grows in great plenty on the tops of the hills, but it is not in that esteem which what grows on more mountainous islands. Although this island is pretty well stored with people, yet it is far from what it was in Father Martini's time, when he describes *Cheuxam*, and this puts me in mind, that the superstitious pilgrimages thereto, mentioned by him, must be meant of the island *Pou to*†, which lies 9 leagues from hence and 3 miles to the eastward of this island, whither (they say) the Emperor designs in the month of May next (being his birthday and the 40th of his age) to come to worship in an ancient pagod there, famous for sanctity, having sent one of his bonzes already thither, to get all things in order.

Chusan. November 22. 1701.

Sir! I formerly told you that the Emperor designed to have come to the island of *Pou tu* to worship in the month of May last, being the 40th year of his age, I should have said of his reign. But all things being prepared there for his reception, he was dissuaded from his purpose by some of his mandarins, who made him believe that the terrible thunder there was very dangerous. This *Pou to* is a small island about 5 leagues round at the east end of this island, famous for the superstitious pilgrimages made thither for the space of 1100 years. It is inhabited only by bonzes, to the number of 3000, all of the sect called *Ho shang*‡, or unmarried bonzes, who live a Pythagorean life; and there they have built 400 pagodas, two whereof are considerable for their greatness and finery, being lately covered with green and yellow tiles brought from the emperors pallace at Nankin, and inwardly adorned with stately idols finely graved and gilded, the chief whereof is the idol *Quon em*§. To these two great pagodas belong two chief

\* *Dolichos sinensis* L.

† 普陀山 *P'u to shan*. This island is indeed exclusively occupied by Buddhist priests. It has 72 Buddhist temples. In the description of his Chinese plants Cunningham mentions some other islands of the Chusan Archipelago viz: *Thow whey san* 桃花山—*Pum si san*.

‡ 和尚 *Ho shan*, a Buddhist priest.

§ *Kuan yin*, 觀音—the Goddess of Mercy.



priests, who govern all the rest. They have several ways and avenues cut through the island, some of which are paved with flagstones and overshadowed with trees planted on each side. Their dwellings are the best I have yet seen in these parts; all of which are maintained by charitable devotions. And the junks which go from Ningpo and this place to Japan touch there both going and coming, to make their offerings for their good success. There is another island called *Kimtong*,\* 5 leagues hence in the way to Ningpo, whither, they say, a great many mandarins retire, to live a quiet life after they have given over their employments. On that island also are said to be silver mines, but prohibited to be opened. The rest of the circumjacent islands are either desert or meanly inhabited by a few fishing people, but all of them stored with abundance of deer. For it is not long, since this island of Chusan began to be peopled. It is true in Martini's days, about fifty years ago, it was very populous for the space of 3 to 4 years, at which time the fury of the Tartarian conquest was so great, that they left it desolate, not sparing so much as the *Mulberry* trees, for then they made a great deal of raw silk here, and in this condition it continued till about 18 years ago, that the walls of the fort or town, which now is, were built by the governor of Ting hai, for a garrison to expell some pirates, who had taken shelter here. About 14 years ago the island beginning to be peopled, there was a chumpeen or general sent to govern it for 3 years, to whom succeeded the late chumpeen, who procured the opening of this port to strangers and whose government continued till April last, being translated to the Chumpeen of *Tien cing wei* †, near to Pekin, and was succeeded by the present chumpeen, who is son to the old *Chun koon* ‡ of Emuy.

They have got no arts or manufactories here, but making of lackered ware, a particular account whereof I cannot as yet send you. They begin to plant the mulberry trees, to breed up worms for the production of raw silk and they make some Tea, but chiefly for their own use. The three sorts of *Tea* commonly carried to England are all from the same plant, only the season of the year and the soil makes the difference. The *Bohe*, or *Voii*, || so called after some mountains in the

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\* 金塘山 *Kin t'ang shan*.

† Now *T'ien tsin fu*.

‡ 中軍 *Chung kün*.

|| 武彝 *Wu yi*, in Amoy *bo he*.



province of Fokien, where it is chiefly made, is the very first but gathered in the beginning of March, and dried in the shade. The *Bing* \* tea is the second growth in April, and *Sing lo* † the last, in May and June, both dried a little in pans over the fire. The Teashrub being an evergreen is in flower from October to January and the seed is ripe in September and October following, so that one may gather both flowers and seed at the same time, but for one fresh and full seed there are a hundred nought. These make up the two sorts of fruit in Le Comte's description of tea: as for his other sort, which he calls flymic pease, they were nothing but the young buds of the flowers not yet opened. Its seedvessels are really 3 capsular, each capsule containing one nut or seed, and, although two or one capsule only come to perfection, yet the vestiges of the rest may be discerned. It grows in a dry gravelly soil, on the sides of hills, in several places of the island without any cultivation.

Le Comte is mistaken in saying (p. 96) that the Chinese are wholly strangers to the art of grafting, for I have seen a great many of his paradoxical *Tallow trees* ingrafted here, besides some other trees. When they ingraft, they do not slit the stock as we do, but cut a small slice off the outside of the stock, to which they apply the graft, bringing up the bark of the slice upon the outside of the graft, they tie all together covering with straw and mud as we do.

Martini says he could never find a Latin name for the *Fula Mogorin* of the Portuguese (v. supra Martini 19). I am sure it is the same with the *Syringa arabica* flore pleno albo in Parkinsone. ‡

He says also, that the *Kieu yeu* or *Tallow tree* bears a white flower like a Cherry tree, but all that I have seen here bears a spike of small yellow flowers like the julus of a *Salix*. ||

The *Bean* or *Mandarin Broth*, so frequently mentioned in the Dutch Embassy and by other authors is only an emulsion made of the seed of *Sesamum* and hot water. §

\* 茗 *Ming*, in Amoy beng.

† 松蘿 *Sung lo*, name of a mountain, see above Martini 23.

‡ Cunningham is right. Lamarck Enc. bot. IV 210 quotes the *Syringa arabica* (already known to Clusius) as a synonym of *Jasminum Sambac*. Ait.

|| Cunningham's statement is correct. See above Martini 36. note.

§ In the narrative of the third Dutch Embassy a *Bean soup* is mentioned which they believed to be prepared with milk and Peking butter (sic!). But it seems to me that the above statements of Cunningham and the Dutch are to be referred to the Chinese condiment commonly called *Bean curd* by Europeans. (Williams' Middle Kingdom, II. 43.)

(I omit the particulars given with respect to fishing, tillage, and obtaining of salt.)

Had I not found the printed Newspapers last year take notice of a singular root brought from China by *F. Fontaney*,\* I should not have told you that I have seen one since I came here, called *Hu chu wu* (which I take to be the same), whereto they ascribe wonderful properties of prolonging life and turning gray hairs into black, by drinking its infusion for some time, in so much that they say it is to be had in value from 10 taëls to 1000 or 2000 a single root, for the larger it is, the more is its value and efficacy: which is too much money here to try the experiment. You have it mentioned in Cleyer's *Medicina sinica*, 84, under the name of *Ho xeu u*. It is likewise painted in the 27 table of those plants Mr. Petiver has of me.†

After this C. relates a Chinese legend with respect to this root. A man fell down from a precipice and found himself in a valley from which he was not able to come out. He lived there for a hundred years feeding on the above-mentioned root. He was finally delivered by an earthquake, which destroyed the valley.

Cunningham distributed his Chinese botanical collection, made in Chusan, at Amoy and on the Dogs islands near Fu chou, among his friends in England. *Plukenet* and *Petiver* seem to have received the greatest part of it. I may be allowed to say here a few words with respect to these ardent and able botanists and their works, in which they described and depicted Cunningham's plants, soon after they had received them.

*James Petiver*, Apothecary of the Charterhouse, London, and secretary to the Royal Society, an active collector of objects of natural history, born about 1658 + 1718. He had correspondents in most parts of the world, who sent him productions, plants, animals, etc. He was a friend of the botanist *Ray* and of Sir *Hans Sloane*, the celebrated promotor of science and President of the Royal Society (born 1660 + 1752), who offered

\* *Joannes de Fontaney*, Jesuit Missionary in China, end of the 17th cent.

† What C. tells with respect to the plant 何首烏 *ho shou wu* is found also in Chinese works. A good drawing of it is given in the *Chin. Botany Chi wu ming shi t'u k'ao* XX. 16, a climbing plant with a large tuberous root, and this agrees with the engraving under the same Chinese name in the Japanese *Botany So mo kou* etc VII. 80, which according to *Franchet* and *Savatier* (*Enum. pl. Japon.* I 402.) is *Polygonum multiflorum*. Thbg. and has in fact tuberous roots.

him £4000 for his collections of specimens. As the Sloanian collection subsequently gave origin to the British Museum (Hanbury's Science pap. 384) Petiver's specimens may also be stored there.

In a paper published in the XXIII. vol. of the Philosophical Transactions (1703) Petiver describes about 70 Chinese plants supplied principally by Cunningham. But previously he had published in his *Museum* (1692-1703) short characteristics of 1000 exotic plants, amongst which we find scattered about 100 from China, the greatest part of them not mentioned in the Philosoph. Trans. Besides this he issued his *Gazophylacii Naturae Decades decem*, 1702-1709, short descriptions and engravings of 100 exotic plants, about 20 of which were selected from Cunningham's Chin. collection.

It appears from Cunningham's letters and from Petiver's quotations that the latter had also received from C. a collection of Chinese drawings representing Chinese plants. Petiver frequently speaks of "Herbarium nostrum sinense pictum."

Leonard Plukenet, born 1642 + 1705, a learned English botanist, educated at Oxford. He was in war with Sloane and Petiver. Plukenet has published many botanical works and described and depicted a great number of new plants especially from America, the East Indies and China. Almost all Chinese plants he mentions had been handed to him by Cunningham, and it seems that the latter had entrusted the greatest part of his herbarium to Plukenet, who described about 400 Chinese specimens in his *Amalthæum botanicum seu Stirpium Indicarum alterum copiae cornu* 1705, intermixed with American and Indian plants. Nearly one half of the Chinese plants Plukenet faithfully figured in vol. III of his *Phytographia* \*. These figures are small and often much reduced from the natural size, but are generally very characteristic.

In 1779 Dr. P. D. Gieseke added an Index Linneanus in Plukenetii opera botanica, in which he ascertained a great number of the plants there described and figured, but with respect to the Chinese specimens in the *Phytographia* he has only in a few cases been able to identify them.

Perhaps the botanist Ray (1628-1705.) disposed also of a part of Cunningham's plants. In his *Historia plantarum*, in the 3d vol. (1704) he describes some of them. It may be

\* The 3rd vol. of Plukenetii *Phytographia* bears the date 1692. But this is evidently an error for each engraving in it is referred to the text in the *Amalthæum*, published 1705. Pl. published also an *Almagestum Botanicum*, 1696, in which a few Chinese plants appear.

however, that he copied from Petiver and Plukenet. I have seen the Hist. plant. but had then no opportunity of comparing it with the Amaltheum and Petiver's works. As appears from Petiver's statements, C. had given also to Sloane some of his specimens.

On the whole, nearly 600 Chinese plants have been described by Petiver and Plukenet from Cunningham's specimens. It would be interesting to know what has become of this herbarium. Petiver's botanical collections as well as those of Plukenet had been acquired by Sloane and were finally incorporated into the British Museum, where they may still exist, or at least some "rudera" of them.

After Cunningham, botanical collections have been made twice at Chusan, as far as I know. Dr. *Th. Cantor* visited the island in 1840 and in an account of Cantor's botanical collections in the Journ. As. Soc. Beng. XXIII. 1854, Mr. Griffith enumerates 133 plants gathered at Chusan, but he gives generally nothing more but the genus names. There is only one plant of the collection he describes as new, viz. *Actinostemma tenerum*. I am not aware whether Cantor's herbarium is now in England or in India.

The well known traveller and botanical collector *R. Fortune* (who died in April 1880) investigated the Flora of Chusan some years later. He first came to that island in 1843 and visited it again in 1850. His plants, distributed by the R. Hort. Soc., are found in all the more important herbarium's of Europe. It seems that only a small part of Fortune's Chinese plants have been described.

Concerning the Crocodile islands (Dogs islands near Fuchou) where Cunningham gathered some specimens, the botanical features of these islands are probably the same as those of the adjacent mainland. The Flora of that part of China, and I must say the same with respect to Amoy, is very imperfectly known. But all plants gathered at those places may, I believe, be found in Dr. Hance's magnificent herbarium, and he is probably the only botanist who would be able to identify Cunningham's plants from the ancient descriptions and drawings left.

A great part of Cunningham's plants, described and depicted by Petiver and Plukenet, are probably included in the later collections alluded to. I therefore have thought it would be useful to bring under the notice of modern botanists and to place together the scattered remarks and diagnoses referring to Cunningham's plants, as found in the Amaltheum



and in Petiver's writings. But as the descriptions there are often long and detailed, I cannot venture to reproduce the whole and shall often confine myself to quoting only the short diagnoses, which generally precede the descriptions, referring the reader to the original works and the drawings. The latter of course will be more serviceable to identify the plants in question, than the descriptions given.

MUSEI PETIVERIANI CENTURIAE DECEM RARIORA NATURAE CONTINENS  
London 1692—1703. 2 tab.

This is an enumeration of exotic plants, from Asia, the Cape of G. H. and America. I extract the following notes on Chinese plants found there. These Chinese specimens were gathered, as Petiver states, chiefly by *Cunningham*, a few of them also by *Keir* and *Barklay*, surgeons, and *Sam. Brown*. The latter visited Chusan before Cunningham.

The first century mentions three Chinese Ferns.

*Adiantum nigrum chinense*, tenuiter divisum, pinnulis minimis obtusis bifidis. Pluk. Alm. 29. tab. 4, 1. Raii. h. pl. 1854. Chinese black Maidenhair with blunt forked leaves. *Hamoy* in China.

*Adiantum tenuifolium*. Lamarck Enc. Bot. I. 44. Gathered by Sonnerat in India.

*Adiantum nigrum lanuginosum* Chinense \*. Pluk. Alm. 30. tab 4, 2.—*Dryopteris lanuginosa* chinensis Raii. h. pl. 1854. Hoary black Chinese Maidenhair *Hamoy* in Chin.

*Filix pyramidalis chinensis*. Filix e China mollis, auricula ad pinnulae basim superne producta, summo folio longius mucronato. Pluk. Alm. 30. fig 2.—Fil. spec. e China delata nobis. Raii. h. pl. 1853. Our China Steeple Fern.

352. *Argentina Emuyaca*, foliis ramosis, altius incis. From Emuy, a Chinese island.

400 *Fagopyrum chinense* Bistortae folio.

402. *Filix Emuyaca* pinnis proliferis mire ornatis.

403. *Filix Emuyaca* pinnis singulis integris et divis, marginibus seminiferis.

425. *Kaduli Emuyaca*, Tuberariae angustiore folio.

498. *Um ki* Chinensibus. Frutex Cynosbaty fructu alato tinctorio, barbulis longioribus coronatis.—The fruit supplies a famed ingredient used by the Chinese for dying scarlet.

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\* *Adiantum Chinense* perelegans ramosum, folio flabelliformi cum rubedine perfuso. Pluk. Alm. ii. tab 4, 3. is *diantum flabellatum* L. Linneus describes yet another Chinese species: *A. chusanum*, which has been referred to *Davallia chinensis* Sw. by Sprengel.



This is *Gardenia florida*. L. See further on Pluk. Amalth. 29.

536. *Muscus denticulatus* Emuyacus minor erectus. Cunningham.

537. *Filix Emuyaca* Plantaginis aq. folio, caule nigricante. Cunningham.

541. *Phyllitis Emuyaca* major ramosa. Cunningham.

544. *Filix Emuyaca* pinnis longissimis integris margine pulverulento. Cunningham.

545. *Filix Emuyaca* pinnis majoribus denticulatis. Cunningham.

547. *Filix Emuyaca* pinnis pyramidalibus serratis maculis in nervum oppositis. Cunningham.

554. *Filix chinensis* Lonchitidis facie, cujus lanago radice *Poco sempie* vocatur. *Kim kow ja* (i.e. canis aurei crines). Herb. nostr. Chin. pict. tab. 10, fig. 8. *Poco sempie*. Mus. R. S. 386.

Probably *Polypodium Barometz* L. sin: 狗脊 *kou tsi*.

640. *Fagara Emuyaca* Cardamomi sapore, ramulis et medio nervo foliorum utrinque spinosis.—Seems to agree with the *Fagara minor* from the Philippine islands, where it is called Cayutana.

The Cayutana is *Zanthoxylum heterophyllum* Sm., but Petiver's plant is probably *Z. nitidum*. D. C.

682. *Tamarisci folio arbor chinensis*, e cujus ligno fiunt sagittae. *Hose Diu*. Herbar. nostr. Chin. pict. tab. 9, 4.

757. *Capillaris chinensis* pinnulis rotundioribus. Fern from China.

857. *Amelanchier chusanensis* folio parvo subrotundo rigido, from China.

858. *Androsace chusanensis* Cortusae Matthioli folio (v. infra Philos. Trans. 52.)

859. *Angola chusanensis* Pruni folio, calice amplo.

860. *Anonymus chusan*. floribus spicatis, petalis tribus angustis.

861. *Apios ex insulis Crocodilorum*.

864. *Arbor chusan*. *Laurocerasi* folio serrato.

865. *Arbor chusan*. *Laurifolio* serrato subtus molli, virgulis verrucosis.

867. *Arbor Emuyaca*, flore minimo stamineo, albente, *Ilicis* folio.

875. *Aster chusan*. foliis superioribus integris, inferioribus Coronopi.

876. *Baccifera chusan*. racemifera, *Loti arboris* folio.

877. *Baccifera chusan*. racemosa, *Arbuti* folio.

878. *Baccifera chusan*. *Theae* folio.

879. *Baccifera* ins. *Crocodyl*. *Celastris* folio.

880. *Baccifera Emuyaca* dispermus, scandens, Flammulae facie.
886. *Calamintha chinensis*, Teucree folio, flore staminoso.
887. *Camphorosmos chusan*, flore piloso.
888. *Caramba Emuyaca*, Persicariae foliis hirsutis.  
The Caramba of Rheede is a *Jussiaea*.
891. *Cerasus chusan*, floribus minoribus plenis.
892. *Chamaerhododendron chusan*, flore albo, Myrti romanae folio.
893. *Chamaerhododendron chusan*, flore coeruleo, foliis et calycibus hirtis.
895. *Christophoriana* forte *Emuyaca*, spinosa, Mori folio molli.
896. *Chusanicus* seu *Planta capreolata*, Arb. Judae folio, flore spicato.
897. *Clematis chusan*, folio cordato umbilicato.
898. *Coccifera Crocodyl*, Pimentae Jamaicensis folio.
899. *Cocculus reniformis* scandens *Emuyacus*, Cotini folio subtus molli.
902. *Conyza chusan* pilosa folio Sonchi integro.  
Probably *Emilia sonchifolia*
904. *Cynoglossum chusan*, summo late ramoso.
905. *Cytisus Crocodyl*, foliis parvis subtus villosis.
909. *Euonymus chinensis*, Glycyrrhizae folio.
910. *Euonymus* forte *chusan*, Berberidis folio.
911. *Euonymus Crocodyl*, Laurocerasi folio.
912. *Euonymus Emuyacus*, Pervinae majoris folio, bacca solitari, vasculo bipartito vel tripartito inclusa.
913. *Eupatorium Crocodyl*, Leonuri folio.
916. *Ficus chusanensis*, Mori folio.
917. *Ficus chusanensis* minima, nigrescens, folio integro, superne scabro, subtus molli.—It bears fruit in Sept.
918. *Ficus* forte *chusan*, folio vulgaris facie sed molliori.
925. *Frutex Crocodyl*, foliis alatis subrotundis glaucis, subtus albidis.
926. *Frutex Crocodyl*, Fagi foliis parvis, venis subtus purpureis.
930. *Hai hoa* Chinensibus, flore albo, siliquis gummosis articulatis.  
Probably *Sophora japonica* L. sin: 槐花 *huai hua*. Pod contracted between the seeds, containing a viscid matter.
931. *Ham shaw* Chinensibus, Arbor flore albo, calyce hirsuto.
935. *Jacobaea chusan*, folio lato.
936. *Jujubae* folio minore, planta repens chinensis.

937. *La boe* Chinensibus. Arbor flore luteo, foliis acutis binis decussatis.

**Chimonanthus fragrans** Lindl. sin: 蠟梅 *la mei* or *la bai* in some Southern dialects.

938. *Lactuca Emuyaca perfoliata*, Sonchi folio.

943. *Lotus arbor Emuyaca*, Betulae folio.

944. *Lupulus chusan*. minor, Rubi folio.

**Humulus japonicus** S. et Z. gathered also by Cantor in Chusan.

948. *Oxyanthus chusan*. Pyracanthae folio.

950. *Persicaria chinensis*, folio subtus albido. V. infra Phil. Trans. 28.

951. *Periclymeni* flore frutex *Emuyaca*, Pervincae majoris folio.

953. *Phaseolus chusan*. siliqua hirta folio angustissimo.

954. *Phaseolus chusan*. siliqua hirta folio latiore.

956. *Phyllitis chusan*. ramosa, pinnis alternis basi superiore auriculatis.

957. *Pimenta chusan*. Buxi folio, floribus filamentosis.

958. *Pimenta chusan*. Melissae folio, flore petaloso.

962. *Pruni sylvestris* facie frutex *Emuyacus*, spinis fere foliosis.

964. *Quinquefolium chusan*. folio subtus incano, albo.

965. *Ricinus chinensis* sebifera, Populi nigrae folio.

**Stillingia sebifera** Michx. V. supra Martini 36.

966. *Ricinus Emuyacus* Verbasci folio, fructu farinaceo.

968. *Ros Solis chusan*. perelegans, caule folioso. V. infra Phil. Trans. 55.

969. *Rosa forte chusan*. Trichomanis folio.

970. *Rubiae* facie planta *Crocodyl*. cordato folio.

Perhaps **Rubia cordifolia**. L.

972. *Samolus Emuyacus*, Rorismarini folio.

974. *Scandens Emuyaca* capreolata planta, foliis cordatis serratis.

975. *Serratula chusan*. folio hastato.

976. *Serratula chusan*. folio subtus incano albo.

977. *Siliquifera chusan*. Fraxini folio fructu sericeo.

978. *Shew kow* chinensibus, folio oblongo serrato nervoso.

979. *Shuran* chinensibus. Arbor trifoliata, floribus minimis racemiferis.

980. *Stoechadis spica* Planta *chusan*. Galeopsis folio.

981. *Styrax liquida*, folio minore ex ins. *Emuy*.

983. *Thea chusan*. floribus majoribus, folio Alaterni serrato. V. infra Philos. Trans. 59.

984. *Thea chusan*. floribus minoribus, folio Alaterni cuspidato.  
 985. *Thea chusan*. sylvestris non potabilis.—The flowers much the same with the common, but the leaves less and thicker.  
 987. *Vaccinia chusan*. flore tubuloso, Pruni folio.  
 989. *Viburnum chusan*. spinosum, folio digitato.  
 990. *Vitex Crocodyl*. foliis oppositis Arbuti.  
 991. *Vitis facie frutex Emuyaca*, foliis serratis integris et tripartitis.  
 992. *Vitis forte Emuyaca* folio trifido dentato.  
 993. *Ulmi* folio minore frutex *chusan*.  
 994. *Ulmi* folio minore splendente *Emuyaca*.  
 995. *Volubilis chinensis* Laurocerasi folio minore.  
 997. *Yang diu chinensibus*. Arbor Salicis folio ramulis pendulis. Frequently painted on Japan work. Of the wood they make arrows.  
 柳楊 *Yang liu* is *Salix babylonica*. L.  
 998. *Ya hap chinensibus*. Arbor flore albo, folio Anonae venosae.  
 999. *Zizyphus chusan*. foliis subtus argenteis, floribus minoribus.  
 1000. *Zizyphus chusan*. suberis folio, subtus punctato.

J. PETIVERI GAZOPHYLACIUM NATURAE ET ARTIS. 1702-1709.

Two volumes, each consisting of 50 plates. The following Chinese plants are represented by the drawings:

Tab. 6, fig. 3 *Cupressus chusanensis*, Abietis folio, from *Chusan*. The leaves are triangular, carinated, stiff and stand off from the stalk; its seed is brown and small, not much unlike Buck wheat but not so regular.

The drawing seems to represent *Cryptomeria japonica*. Don. Fortune observed this tree in Chekiang.

Tab. 12, fig. 3. *Tagetes chinensis*, foliis undulatis, radice cordiali. Herbar. nost. Chin. tab. 27, fig. 3. This is the wonderful plant *Hu chu u* of which Cunningham speaks in his letter.

As we have seen, the Chinese plant, C. alludes to, seems to be *Polygonum multiflorum*. Thbg. Petiver seems to reproduce the Chinese drawing of his Herbarium Chinense, which is not correct.

Tab. 19, fig. 5. *Sagittaria chinensis* foliis ternis longissimis. Herbar. nost. Chin. tab. 12, fig. 3. *Sa heo chaw* indigenis.

According to Lam. Enc. Bot. II. 504, this is *Sagittaria trifolia* L. Kth. enum. III. 157 thinks that *S. chinensis*. Sims. may be the same.

Tab. 19. fig. 6. *Ranunculus globosus chinensis*, flore pleno aurantiaco. *Wi tung te hoa* chinensibus. Herb. nostr. Chin.



tab. 18, fig. 18. This beautiful plant would be a fine ornament to our gardens.

Tab. 21, fig. 10. The *Tea shrub* is here figured with its leaf, flower and fruit.

Tab. 24, fig. 8. *Ninjin* and *Ginseng officinarum*. Dale Pharm. 340. 11. Raii hist. plant. 1338. Plukenet 101.7. Copied from a painting of the Roy. Soc. Grows in China and Japan.

The root of Ginseng is correctly represented, but not the leaves.

Tab. 26. *Pimenta chusan*. folio Alaterni. Vide infra Phil. Trans. 85.

Tab. 27. *Ou tum chu*.

Vide infra Phil. Trans. 82 *Sterculia platanifolia*.

Tab. 33, fig. 4. *Thea chinensis*, *Pimentae jamaicensis* folio, flore rosaceo simplici.

This is *Camellia japonica*. L. See Lam. Enc. Bot. I, 572.

Tab. 33, fig. 8. *Androsace chusan*. Cortusae Matthioli folio. Museum nostr. 965. I take this elegant plant to come next in kind to *Linum umbilicatum*, which Tournefort calls *Omphalodes*.

The drawing seems to represent *Androsace saxifragae folia*. Bge.

Tab. 34, fig. 3. *Ricinus chinensis sebifera*, *Populi nigrae* folio Mus. nost. 965. Chinese Tallow tree. Philos. Trans. 90.

*Stillingia sebifera* Michx.

Tab. 34, fig. 11. *Teucrium Crocodyl*. V. infra Philos. Trans. 41.

Tab. 35, fig. 7. *Vaccinia forte chusan*., *Laurocerasi* folio flore tubuloso.

The drawing seems to represent *Vaccinium bracteatum* Thbg. or *V. chinense*. Benth. Fl. hongk. 200.

Tab. 35, fig. 11. *Rosa chusan*. glabra, *Juniperi fructu*. This Rose I have received both from Chusan and China.

Linneus identifies this Rose with his *Rosa indica*, but Lindley with his *R. microcarpa*.

Tab. 36. fig. 1. *Gramen Lagopoides chusan*. spicis cristatis palescentibus. Phil. Trans. 24.

*Pennisetum* ?

Tab. 36, fig. 7. *Coccifera chusan*. *Coryli* folio, floribus exiguis racemiferis. Phil Trans. 67.

*Symplocos* ?

Tab. 36, fig. 8. *Fagara chusan*. *Rhois virginianae* folio, caule alato.

The drawing seems to represent *Zanthoxylum Bungei* Pl.



Tab. 45, fig. 9. *Zapotl. chinens.* fructu cinnabarino, *Xicu Sinensibus*, *Chicoy* Hispan., *Figocaque* Lusitan. Its leaves single, 6 inches long and 3 broad.—fig. 10. *Zapotl.* fructus, dried in the sun, as they do figs.—fig. 11. *Zapotl.* ossiculum.

*Diospyros Kaki* L. sin. 柿子 *shi ts'z.*

Tab. 63. fig. 8 is a *Loranthus*. See further on Linn. Chin. pl. 220.

Tab. 95. fig. 6. In Chinese *Samtanguy* or *Flammula*. Cat. 379. Grows about a yard and a half high, into many branches, bearing at the top scarlet Jasmin-like flowers. Kam. Ray. App. p. 7 pl. 23.

*Ixora stricta* Roxb. is called 山丹 *shan tan* (the red of the mountains) in Chinese.

Tab. 97. fig. 2. A Chinese Feather-few, with double white or blush flowers. Cat. 337.

Tab. 97. fig. 3. Another with a double yellow flower. Mus. Pet. 786.

ACCOUNTS OF SOME PLANTS FROM CHUSAN, COLLECTED  
BY J. CUNNINGHAM.

Published by *J. Petiver*. Philos. Trans. XXIII (1703.) p. 1421.

The first 20 numbers refer to Corals from the Philippine Islands.

21. *Lingua cervina chusanensis* maculata media.

The root of this is like our common Polypody with fibres running from them. The leaves resemble Harts-tongue, but are longer and narrower, but as that bears its seed in slant streaks on the back of the leaves, these have them in round spots like those in Polypody, one on each side of the middle rib at near half an inch distance, beginning near the point, and reach above half the leaf.

22. *Lingua cervina chusanensis* maculata, parva.

This has a fibrous root, its leaves have scarcely any footstalk and rarely exceed 3 inches in length, the seeds stand in round spots like the last, as large but much closer set, reaching from the middle rib to the edge of the leaf, coming down about half way.

23. *Arundo chusanensis* polydactyloides, perelegans.

This reed has a very beautiful tuft, composed of about a dozen pappose spikes, like some of our Indian downy Cocks-foot grass, each above a span long.

24. *Gramen Lagopoides chusanense*, spicis aristatis pallescentibus.

This is next in kind to our *Gr. Lagop. guineense*, Gazoph. nat. tab. 2, fig. 7, et. Mus. 238, but its spikes are larger and both glumae and aristae are whitish, whereas the Guinea sort when full ripe is ferrugineous and its spike turns downwards. Dr. H. Sloane has the only specimen I have as yet seen of this new grass.

25. *Panicum cristatum chusanense*, spica multiplici nude.

This is a very elegant grass, each capsule somewhat resembles those of our *Nasturtium verrucosum* or Swines Cress.

26. *Secalis facie frumentum chusanicum*.

27. *Cadelari siciliana* folio acuto, *Amaranthus sicalus* spicatus.

This is *Achyranthes argentea* Lam., a variety of *A. aspera* L. observed in China by Staunton and others.

28. *Persicaria chinensis*, folio subtus albido, Musei nostri 950.

This resembles our Arse-smart, but the leaves underneath are very white and soft.

29. *Triopteris scandens chusanensis*, cordato folio.

This is a twining plant, like our black Bryony, and its leaves not unlike, the capsules resemble the *Melianthus*, but have only three wings containing membranaceous seed, like those of the Oleander.

30. *Aster Eupatoroides chusanensis*, Hyssopi folio.

The leaves stand alternately on the stalk, which towards the top branches out into many small flowers with little radiated petals. These look at first view like our *Eupatorium*.

31. *Tussilago chusanensis*, ramosa, folio rotundo, glabro.

This has smooth round leaves about the root at the time of the flowering, and narrow leaves at the stalk, which is branched, each terminating in one flower of the same bigness with ours.

32. *Abrotanum chusanense*, *Thalictri* folio.

The leaves are decply jagged at top, generally into 3 or 5 segments. The flowers are extremely small.

33. *Abrotanum chusan.* segmentis foliorum tenuissime serratis.

The flowers of this are as large as the common Southernwood, the leaves finely divided and notched like those of some umbelliferous plants.

34. *Absinthium umbelliferum chusan.* Achoavan folio.

The stalk is round, hoary and slightly furrowed, the leaves somewhat like the next, but less, and more serrated.

35. *Matricaria chusan.* flore albo minore simplici. A. *Matricaria japonica* fl. min. albo simpl. Breyn. prodr. 2. p. 663?

The leaves of this are like Mugwort but less, the flowers scarcely so big as our Featherfew.

36. *Matricaria chusan*. flore luteo minore simplici, *keuk hoa* Chinensibus.

The leaves and flowers are much like the last, the discus is large and yellow as are the petals about.

Probably *Pyrethrum* (*Chrysanthemum*) *indicum*. Cass. sin: 野菊花  
*Ye kü hua*.

37. *Verbena chusan*. Majoranae folio, subtus molli, flavescente.

On each side of every joint come forth longish leaves, some bigger, others less, soft underneath and yellowish. From some of these joints, especially towards the top, come spikes of flowers and seed, after the manner of common Vervain.

38. *Verbenaca chusan*. Persicariae folio subtus pallescente.

The stalk is for the most part 5 square, the leaves grow opposite, by turns crosswise. It bears a long spike of flowers, each with a long tube or neck set in a small turgid calyx.

39. *Mentha chusan*. spicata holosericea.

The stalks of this plant are very hoary and soft, as are its leaves, especially the under side.

40. *Teucrium chusan*. flore singulari pediculo semiunciale insidente.

Each flower stands single on a half inch foot stalk, with 4 long stamina, and a style like the *Teucrium Boeoticum*.

41. *Teucrium Crocodylium*. *Styracis* folio minore. Gaz. nat. tab. 34, fig. 11.

42. *Alcea forte fruticosa chusan*. folio summo lato, subtus molli.

The leaves are somewhat like our Aspen-tree, very broad at the top, with a small point in the middle, slightly notched, a little rough above, but underneath very soft.

*Hibiscus tiliaceus*. L.

43. *Rubus chusan*. folio *Corchori*.

The twigs and footstalks are thorny, the leaves single, sometimes lobated, broad at base, but grow tapering to a very narrow point.

Perhaps *Rubus corchorifolius*. L. of Japan.

44. *Rubi facie planta chusan*. folio *Altheae* acutiore.

The stalks thorny, the leaves grow alternately on short pedicles, and some of them are lobated. At the bottom of each grows a small scaly cone like a bud.

45. *Alectorolophus chusan*. viscosa, *Achoavan* folio.

This and the next seem very elegant plants, but I dare not meddle with their descriptions until I receive better specimens of them.

46. *Rapunculus* seu *Cardinalis*, forte *Chusan*. Sambuci folio.

47. *Anonis chusan*. pubescens, Lupini facie.

This seems herbaceous, the leaves are very large, somewhat hoary, but the stalks much more, the flowers spicated and large, resembling the yellow Lupine, but have the face and hoariness of the common blue.

48. *Astragalus chusan*., sinapis siliqua.

These leaves resemble the Saint Foin, the pods are about 3 inches long, with 2 or 3 swellings, and end blade-pointed like the pods of mustard.

49. *Cowhage chusan*., floribus parvis ex alis foliorum.

The stalks, young leaves, flowerhusks, and pods have all a rusty hoariness, in the full grown leaves it is much less. From the bosom of these comes a small spike of little flowers, by which and its hoariness it is easily distinguished from all others.

50. *Cytisus chusan*. tetraflorus.

Its leaves are small, finely veined and end in a hair. What is peculiar in this, is to have 4 flowers on a naked or leafless inch foot stalk.

51. *Polygala chusan*. folio subrotundo, spica aphylla.

This is distinguished from others in having broader obtuse leaves, excepting towards the top they are a little pointed and from the middle of each leafy stalk comes out a naked spike of flowers.

52. *Androsace chusan*. Cortusae Matthioli folio. Mus. nost. 858. Gazoph. tab. 33, fig. 8.

Seems to be *Androsace saxifragaefolia* Bge.

53 *Lysimachia chusan*. Gentianellae folio, flore albo.

This in manner of growing resembles our yellow Loostrife, but the flowers are white, petala less, and more pointed. Its capsule ends in a thread. I saw a branch of this in flower and seed with Mr. Sam. Doody, which Mr. George Loudon had gathered in some garden, I think about town.

54. *Lysimachia chusan*. spicata, Persicariae folio, flore exiguo.

These leaves grow inordinately, are narrow-pointed at base, without footstalks. At the top of the branches grow slender spikes like Arsmart, with small flowers and seed vessels like Flax, but much less.

55. *Ros Solis chusan*. perelegans, caule folioso. Mus. 968.

This is a very peculiar sort of Sundew, in having leaves on the stalks, which towards the top ramify and flower.

Trees.

56. *Abies argentea chusan*. foliis acutissimis.



This resembles the Silver-fir but the leaves are somewhat serrated and very sharp.

Perhaps *Abies Kaempferi*. Lindl.

57. *Acer forte chusan. folio minore trifido.*

These leaves very much resemble the *Acer monspelianum* I.B. They are smooth above and glaucous underneath, standing on long slender reddish stalks. The fruit of this and the next I have not yet seen.

Perhaps the Japanese *Acer trifidum*. Thbg., observed also near Ningpo.

58. *Aceris folio arbor chusan. virgulis spinosissimis.*

Its young branches are reddish and very full of brier-like thorns, amongst these leaves inordinately grow, the base of each pedicle leaving an impression like a V consonant on the stalk. The leaves have very much the face of the common great Maple or Sycamore with long pedicles, whose base agrees with the branches.

59. *Alaternus chusan. Arbuti folio. Gazoph. tab. 36. Thea chusan. floribus majoribus, folio Alaterni serrato* Mus. nost 983.

By its leaves and flowers I at first took it for a Tea, but havin lately received it in berry, I find it to be another family. The leaves are stiff, serrated, and pointed, generally thickest towards the tops of the branches. From the bosom of these and below grow many small flowers close to the stalk, which are succeeded by little berries, that are both calyculated and pointed.

60. *Arbor chusan. Frangulae folio majore subtus albido molli.*

Although I have not yet seen the flower or fruit of this tree, yet I could not omit it, because its leaves are very distinguishable from any that have yet come from this island. They seem, especially the young ones, to have the texture and face on the upper side of our Frangula or Alderberry, yet somewhat softer, but its peculiarity is underneath, in being white, softish and having its middle vein spongy, and towards the stalk rusty coloured, as are its younger branches.

61. *Baccifera chusan. Caryophy lliaromat. folio, Patsjotti flore.*

The leaves resemble those of cloves, but are somewhat thicker, generally about  $1\frac{1}{2}$  inch broad and 3 long, growing alternately. From the bosom of each come 3 or 4 pentapetalous flowers somewhat like the Malabar Patsjotti (Hort. malab. vol. 5.) each filled with large curled like apices ending pointed. These are succeeded by black berries set in a small 5 starred calyx, its point  $\frac{1}{4}$  of a inch, each standing on a half inch foot stalk. Out of one berry I took 11, from another near 20 small shining brown seeds, of different shapes from their lying together.



62. *Baccifera chusan*. Ligustri facie.

Its larger woolly twigs are smooth, cinereous and speckled, the smallest woolly, the leaves grow by pairs, at the top come the flowers, loosely spiked, each in a small cupped calyx, the berries less than currants, black with a bluish cast, each on a very short footstalk and in an undetermined cup, which seemed to want a part on one side. In each berry is one large oval kernel.

63. *Buxus chusan*. folio praelongo.

This has the face and the texture of the common Box, but the leaves are longer, very narrow at the base, broadest near the middle and blunt at the end.

64. *Buxi affinis Emuyaca*, folio rugoso.

The twigs are reddish and rough, as are the under sides of the leaves, but smoother above. They stand on very short footstalks and have this particular, that the upper half of each leaf is somewhat lobated or largest. At the ends of the branches grow commonly two or more rough capsules gaping like the Fagaras. Each of these contains 1 or 2 black oval shining seed somewhat bigger than an Oat.

65. *Camphora officinarum*. The Camphire tree.

It is very well figured and amply described in Breynius centuria (in 1678) and first Prodromus.

66. *Castanea chusan*. folio fere serrato, subtus glauco.

The twigs are blackish with many small warts, the leaves grow inordinately, on short pedicles, most of them more or less thorny, dented, and some smooth. Underneath they are glaucous and somewhat soft.

67. *Coccifera chusan*. Coryli folio, floribus exiguis racemiferis. Gazoph. tab. 36, fig. 7.

Its twigs are speckled, the leaves of different magnitude and breadth, lightly serrated, standing on an inch footstalk. At the top of each twig grows a small racemose spike of little flowers, which are succeeded by dry berries, growing like currants.

*Cocciferae* I call such trees and shrubs, as have dry berries like the *Cocculus Indiae*, in opposition to those, that are moist, as goose berries.

68. *Coccifera Emuyaca*, folio marginibus crispis.

The stalk of this is furrowed irregularly like Elder, its leaves have the face and shape of a Willow Bay, but peculiarize themselves by drawing their edges unevenly inwards, which swell the upper side and make them seem curled. Their footstalks are scarce  $\frac{1}{2}$  inch, its cocca, or dry berry, like the

Allspice or Jamaica Pepper, is set in a 4 or 5 starred calyx in a loose cluster, each on an  $\frac{1}{2}$  inch footstalk. Between the outward skin and kernel, which is solid and very hard, is but little space.

69. *Crista Pavonis Chinensis*. Abrus folio. *Bo ya hoa* Herbar. nost. Chin. tab. 2, fig. 4.

*Hoa* in the Chinese language signifies a flower. The leaves are much less and narrower than the American kind, otherwise in its spikes, flowers and way of growing it very much resembles it.

*Crista Pavonis* is *Adenanthera pavonina* L. Lam. Enc. Bot. II 76 mentions it as a native of China. Dr. Hance has observed it in Hongkong.

70. *Cupressus chusan*. Abietis folio. Gazoph. Tab. 6. fig. 3.

Where you may with its figure see a description of its leaves and seed.

It bears its cones single at the end of each branch; the scales of these, when they are open or cracked, are serrated and rugged.

As we have stated above (Gazoph. l.c.) this is *Cryptomeria japonica*. Don.

71. *Euonymo affinis chusan*. Fraxini folio, semine nigro.

The leaves grow opposite, and generally 3 pairs tailed, i.e. one at the end. The footstalk is very short and next the tail scarce any. The fruit grows in clusters, each husk rugose, including one black shining seed.

72. *Fagara Emuyaca* Fraxini folio.

This is distinguished from the next in having much broader leaves. They grow opposite and are much like the Ash. The berries are about the bigness of Pepper and grow in small clusters. The tender shoots and first sprouts are prickly, in the more grown they are not so discernable. I have not as yet observed any prickles on the leaves of this kind except in its first shoots, which are very small and wear off as they grow older.

I call *Fagarae* those trees and shrubs, whose berries split like those figured by Garcias ab Horto, Gerard, Parkinson, Clusius, etc. There are also these peculiarities, which generally attend this tribe, viz., the branches are prickly and often the leaves on the underside and middle rib, and sometimes on both sides and the lesser veins. The berries split in the middle and discover a black shining seed, the outer skin rough, tastes hot and spicey. The leaves in all I have yet observed are perforated like St. Johns wort, Orange leaves, Myrtle. The Hercules and prickly yellow woods of the W. Indies are of this family.

The genus to which the *Fagarae* of the ancient botanists belong is now called *Zanthoxylum*. Lin.

73. *Fagara chusan*. *Fraxini* folio angustiore.

The leaves of this are not only narrower than the last, but prickly underneath and the prickles are very thick set on the branches and between the leaves.

74. *Fagara chusan*. *Rhois virginianae* folio, caule alato. *What chaw* in Chinese. Gazoph. tab. 36, fig. 8.

These leaves very much resemble the Virginian Sumach, with a winged or welshed stalk, with lightly serrated transparent notches. Dr. Sloan has a fair specimen of this in fruit, which ripens in October.

As has been shown above, this seems to be *Zanthoxylum Bungei*. Pl. sin: 花椒 *hua tsiao*.

75. *Frutex chusan*. *Fagi* folio, fructu sulcato.

This very much resembles No. 926 Musei nostri, but is in all parts much larger, especially its leaves, which are very like the Carolina plant at No. 915. Its fruit grows naked at the top of the branches from a reversed calyx, and is sulcated like the capsule of an *Adhatode*.

76. *Gelseminum chusan*. folio *Betae* hirsuto.

The leaves somewhat like Beet, but hoary, the flower is leaved, in shape much resembling *Nerium*. The apices on each stamen seem double headed, the calyx is quinquefied and hoary. It grows spikated, as I observed in a very large specimen amongst Dr. Sloane's dry plants.

77. *Hedera arborea* C. B. 305. 1.

I can see no difference between this and our common Tree Ivy. (*Hedera Helix* L. var. *arborea*).

I may observe that among Cantor's Chusan plants *Hedera Helix* L. is mentioned.

78. *Spurge Laurel*.

Pet. means *Daphne laureola* L.—Fortune has gathered *D. Fortunei* Lindl. in Chusan.

79. *Lycium chusan*. *Pruni minoris* folio.

The twigs of this end in a thorn, the leaves are like the slow but less-finely serrated, growing inordinately on very short stalks. The berries are black and wrinkled like pepper and of that bigness. They stand on a  $\frac{1}{4}$  inch footstalk in a small round calyx. Under the thin outerskin lies one or two kernels.

An undetermined species of *Lycium* is noticed in Cantor's collection. *L. chinense* L. has been observed in North-China as well as in the South.

80. *Mandaru forte chusan*. folio acuminato, alte bifido.

The leaves which are all of this plant I have yet seen, seem to be of the Malabar kind of *Mandaru*. The leaf is deep cut and glaucous underneath.

Mandarin is *Bauhinia*. 3 species of it are known from Southern China viz. *B. glauca* Wall., *B. Championi*. Benth., *B. chinensis* Vogel.

81. *Mori facie chusan*. folio subtus molli ferrugineo.

82. *Ou tum chu*. P. Le Comte. *Gou tum shu* Herb. nostr. Chin. tab. 6.—Gazoph. tab. 27. folio trifido, petalis bacciferis.

This is a wonderful tree and very particular in the product of its berries, which I take to be the fruit. The flowers grow separate from the leaves in a large loose or sparse tuft, after the manner of *Fraxinella* or *Dittander*, from the larger stem each little one has many flowers, composed of 5 broad green petala or leaves like those of our *Adderstongue*, every one standing on  $\frac{1}{2}$  inch pedicle starwise. On both the edges of these grow one or more stalkless berries, of the bigness of *Holy*, rugged now dry. I opened one of them. A large white cavity and a small decayed substance only remained in it.

Petiver gives a correct description of *Sterculia platani folia*. Cav. (see above Le Comte), only he takes the spreading follicles of the fruit for flowers.

83. *Paliurus Emuyaca major* folio rotundiore.

This seems to differ from our European sort in having its leaves much larger and round.

Probably *Paliurus Aubletii*. Shult. which has been observed in South China and Japan.

84. *Palmae Christi vulgaris facie*, forte *Chusan*. caulibus et foliis pubescentibus.

Very near the basis of the footstalk of each leaf it has 2 long and very narrow threadlike auricles.

85. *Pimenta Chusan*. folio Alaterni. Gazoph. tab. 26. *Thea chusan*. floribus minoribus, folio Alaterni cuspidato. Mus. nostr. 984.

Its leaves stand on short footstalks, they are pointed, stiff and somewhat notched. From the bosom of these and at the top of the branches come forth many small flowers, full of stamina like the *Tea* but much less, which made me conclude it was of that family. But Mr. Cunningham has since sent it me in fruit, which I find a small dry berry of an oval bottled shape, coronated somewhat like a clove.

86. *Populi facie chusan*. folio subtus molli ferrugineo.

This has the shape, thickness and softness of *Abele* leaves, but instead of white is rusty coloured underneath.

87. *Quercus chusan*. Castaneae folio pubescente.

The stalk and the underside of the leaves are hoary. Its catkin or julus round and echinated, as Dr. Cunningham says, but its acorn small and smooth.



*Quercus chinensis* Bge. of North-China has leaves resembling those of the chestnut.

88. *Rhamnus Emuyacus* maritimus, flore coeruleo.

The leaves like Sea Purslain but smaller and nearly stalkless. From them towards the top of the branches come 2-3 pentapetalous flowers set in a like divided calyx. The footstalks of some of them are near  $\frac{1}{2}$  inch.

89. *Rhus Emuyaca* folio serrato subtus molli, rachi alato.

Some of these leaves are broader and more or less serrated than others. The stalk is larger or smaller winged as the twigs are older or younger. Mr. Cunningham says they eat the berries which are sour and have a dew on them. He further observes, that from the broken branches there issues out a turpentine like balsamic liquor.

Perhaps *Rhus semialata* Murr. which is found in North-China as well as in the South, or *Rhus chinensis*. Mill.

90. *Ricinus chinensis sebifera*, Populi nigrae folio. Gazoph. tab. 34, fig. 3. Mus. nost. 965. Kieu-yeu P. Martini in Atl. sin.

The leaves grow alternately on long slender footstalks, some of them much extended in the middle and very sharp pointed. The flowers are yellow, mighty small, and grow in a slender catkin like those in Hazel. The fruit is about the bigness of a middling nut, smooth, blackish, and trisulcated, opening into 3 parts, discovers as many white seeds, from whence and its kernels, I suppose, the suet or fat is produced, each being covered with a white fatty body, under which is a brown hard shell, containing an unctuous kernel, which by bruising turns almost wholly to an oil.

Mr. Sam. Brown first sent me this some years ago from China, since which I have received it from Emoy and Chusan. There are two young trees of this now growing, September 27. 1703, in the Charterhouse, raised this year by Mr. Cole Gardiner.

The tree here described is *Stillingia sebifera* Michx. repeatedly spoken of in this paper.

91. *Ricinus forte chusan*. *Tiliae* folio.

These leaves grow alternately on footstalks, some above 2 inches long, of the bigness of the Mulberry and Lime tree, but not serrated. At the top grow spikes of thrummy flowers, like the common Palma Christi, but closer set. I hope the next ship from Chusan will bring me it in fruit.

92. *Thea chinensis vera* potulenta. Gazoph. tab. 21, fig. 10.

*Chaa chinensibus*.—Bontius Hist. nat. Ind. or p. 88, fig. The principal authors, who have given us accounts of the Tea plant are: Bontius, Breynius, Dufour, Pecklin, Pomet, Ray, Tulpius.

93. *Thea chinensis*, Pimentae jamaicensis folio, flore rosaceo simplici. Gazoph. tab. 33, fig. 4. *Swa Tea* seu *Cha hoa* Chinens. Herb. nostr. Chinense. tab. 6, fig. 11.

This plant has a very beautiful flower, some being single and of a deep red, others white and some striped, there are also of these colours with double flowers. The Chinese and the Japanese keep them as an ornament in their gardens. The young flower bud is scaled like a cone. The fruit is about the bigness of a chestnut, somewhat triangular, including under a very thick woody shell several seeds disposed into 3 cells. It flowers in February.

According to Lammarck Enc. Bot. I. 572, this is *Camellia japonica*. L. Petiver is the first botanist, who describes the plant.

94. *Thymelea chusan*. Cydoniae folio.

The flowers are like Jasmin but 4 leaved, their tube or neck hoary and about  $\frac{1}{2}$  inch long.

95. *Thymelea chusan*. Myrti rom. folio.

96. *Vitis chusan*. trifido folio.

97. *Vitis chusan*. folio parvo molli.

#### CHINESE PLANTS DESCRIBED AND DEPICTED BY L. PLUKENET.

As has been stated above, Plukenet described in his *Amaltheum botanicum*, probably in 1703 and 1704, about 400 Chinese plants almost all it seems from Cunningham's collection. About 180 of them he represented by good drawings in his *Phytographia*, pars III. The plants in the *Amaltheum* are arranged alphabetically and the Chinese plants intermixed with Indian and American species and plants of the Cape. I shall extract in the following pages the diagnoses of all the Chinese plants of which engravings are found in the *Phytographia* and also of the greater part of those only described, omitting however in many cases the detailed descriptions. Plukenet generally quotes Cunningham's original descriptions. The pages quoted refer to the *Amaltheum*, the plates to the *Phytographia*, vol. III.

*Abies major sinensis* pectinatis Taxi foliis. subtus caesiis, conis grandioribus sursum rigentibus, foliorum et squamarum apiculis spinosis. P. 1. Tab. 351, fig. 1.

*Cunninghamia sinensis* R. Br.

*Abies maxima sinensis* pectinatis Taxi foliis, apiculis non spinosis. P. 1. Tab. 351, fig. 2.

The drawing seems to represent a *Cephalotaxus*.

*Abrotanum mas sinicum* latiori folio, cum pulchris corymbis. P. 1. Tab. 353, fig. 1.

*Abrotanum sinense* latiori et multifido Artemisiae folio, rigidiusculis apicibus spinularum aemulis insignito, cum parvis corymbis. P. 1. Tab. 353, fig. 4.

*Abrotanum tenuifolium* dense fruticosum, cum exiguis corymbis. Insula *Cheusan*. P. 1. Tab. 353, fig. 6.

*Abrotanum sinense* tenuifolium, corymbis majoribus elegantissimis. P. 2. Tab. 351, fig. 5.

*Abrotanum sinense* tenuissimis longioribus foliis corymbis perexiguus. P. 2.

*Abrotanum mas Sinensium* foliis et corymbis minutissimis. P. 2.

*Absinthium sinense*, romano haud absimile. Ex insula una de *Crocodylis*. P. 2.

*Absinthium maritimum Sinarum*, Lavandulae folio, pulchrioribus corymbis inodorum, sapore aromatico. Abs. folio argenteo vel incano, floribus plerumque singularibus lutescentibus. Cunningham. *Cheusan*. Oct. floret. P. 3. Tab. 353, fig. 5.

**Tanacetum chinense** A. Gray. (Maxim. Decad X.)

*Acinos* multis effigie, procumbens, ex caulicorum geniculis radicata, herba capsularis. Flos coeruleus monopetalus, tubulatus quadrifidus. Folia parva, laevia, subrotunda, ex adverso bina, e quorum alis proveniunt flores. Cngh. *Cheusan*. Floret Oct. P. 4. Tab. 354, fig. 2.

*Aconitum minus autumnale cheusanense*, sin : *Tsou u* dicitur. Floret Sept. Oct. P. 5.

In Peking A. *Kuznetsowii*. Rehb. blue flow. is called 草烏頭 *Ts'ao wu t'ou*. Fl. Sept.

*Alcaea indica Sinarum*. Frutex arborescens flore amplo luteo Malvaceo, fundo purpureo, fructo villosa, in 5 loculamenta diviso semina fusca reniformia. Folia fert ut *Populus alba*. Fl. Junio, semen perficit Sept. Est species *Ketmieae*. Cngh. P. 6. Tab. 355, fig. 5.

**Hibiscus tiliaceus**. L. (Gieseke.)

*Alcea sinica Manihot*, fructu pyramidato, hirsuto, quinque-capsulari, seminibus reniformibus, foliis digitis longioribus, sin : *Tchu whei* dicitur. Cngh. P. 7. Tab. 355, fig. 2.

**Hibiscus Manihot**. L. (Gieseke). By the Chinese name given probably 秋葵 *ts'iu k'ui* (*dziu hwe* Shanghai.) is intended. In Peking this is the name for *Hibiscus Abolmoschus*.

*Alcea olitoria* s. *Corchorus longiori folio Sinarum*. P. 7.

**Corchorus capsularis**. L. See Lam. Enc. Bot. II 104.

*Alni folia arbor e Chusan*. P. 8.

*Althaea fruticosa sinensis*, Betonicae folio majore. P. 11.

*Althaea fruticosa sinensis*, foliis parvis angulosis, seminibus incanis. P. 11. Tab. 355, fig. 3.

*Amaranthus sinicus latifolius*, spica candidissima. P. 12.

*Amaranthus parvus sinensis*. Bliti minoris folio, spica laxa virescente tenui, *Addecomogule* Malabarum. P. 12. Tab. 356, fig. 2.

*Ambrosiae* (forsan) e China Anguria foliis accedenti, *Almagesto* 27 similis, ex ins. *Crodit.* An potius *Matricariae japon.* spec. sinica, *keuk hoa* Sinis dicta. P. 13.

*Anonymos cheusanensis* sideratidis folio, fructu Ulmi samaris hand absimili, sed minore. Flos albus minimus, monopetalus quintifidus. Capsula subrotunda, semen unicum, planum et ovatum, instar seminis Sesami continens. Aperto flore protuditur, et adnascitur membrana rotunda, instar squamae, per longitudinem pediculi floris transcurrentis, capsulae autem non adnascit, sed latet quasi ad membranae centrum excavatum. Flores e foliorum alis et caulium summitatibus nascuntur, in muscariis dispositi. Folia ex adverso bina, oblonga et leviter crenata. Oct. flor. Cngh. P. 16. Tab. 443, fig. 1.

*Anonymos cheusanensis* Betonicae folio incano, Chamaecisti flore luteo, praelongo, pentapetalo, fructu Balsaminae foeminae trifariam ab ima parte dehiscente. Sept. fl. Cngh. P. 16. Tab. 360, fig. 2.

*Antirrhinum minus cheusanensis*, Anchusae folio scabro, flore luteo, ad fundum superius extra et intus purpurastente P. 17. Tab. 358, fig. 1.

*Aquilegiae* corniculis, Moschatellinae foliis planta pusilla. *Chusan*. P. 19. Tab. 360, fig. 3.

*Isopyrum adoxoides* D. C. Prodr. I. 48. Lam. Enc. Bot. III. 99. Spreng. Syst II 470. F. B. Forbes in the prov. of Kiangsu (Journ. Bot. 1880 p. 257) Hancock near Ningpo (Maximow. Frag. H. Asiae orient. 1879. p. 3.

*Arbor baccifera cheusanensis*. Fagi folio, subtus glauco, fructu singulari quadrifido, ad foliorum ortu sessili. P. 20.

*Arbor indica chusanensis*, Salicis latiori folio, leviter serrato, flosculis ad foliorum exortum, confertim sessilibus. P. 21.

*Arbor cheusanensis*, Arbuti minoribus foliis, flosculis ad foliorum alas, curtis pediculis deorsum tendentibus affixis P. 21. Tab. 402, fig. 3.

*Arbor prunifolia cheusanensis*, baccifera, fructu parvo, rotundo, summis ramulis in spicam disposito. P. 21. Tab. 361, fig. 3.

*Arbor indica cheusanensis*, Salicis odoratae folio, fructu ex alis squamato calyce donato. *Swa tea* Sinensium, flore pleno, albo, rubro et variegato. Sunt variae species Theae Indorum. P. 21.



**Camellia japonica.** L. V. supra Philos. Trans. 93.

*Arbor baccifera cheusanensis*, Euonymi foliis undulatis et punctatis, fructu rotundo, parvo, calyculato, rubro, *Oxycanthi* aemulo. P. 21. Tab. 362, fig. 6.

*Arbor sinensis*, Canellae folio minore, trinervi, prona parte villosa, fructu Caryophylli aromatici majoris, villis similiter obducto. Ins. Crocodil. P. 21. Tab. 372, fig. 1.

*Arbor cheusanensis*, Fraxini foliis superne dilute virentibus, subtus lividis, summa singulari pinna alas claudente, caeteris multo majore. P. 22.

*Arbor sinensis Taxi* folio, apicibus obtusis. P. 22.

*Arbor cheusanensis baccifera*, Coryli folio, summis ramulis racemoso. P. 25.

*Arbor Sinensium*, Laurocerasi foliis angustioribus, alterno ordine sitis. P. 25.

*Arbor Sinensium* Lanri folio *Lei chi*, i.e. Oculum Draconis, fructum ferens; et aliquando *Lung yen* indigenis audit. Michael Boym Flora sin. P. 25. Tab. 365, fig. 6.

**Nephelium Litchi** Camb. and **N. Longan.** Camb. Plukenet erroneously takes these two species to be identical. V. supra Boym 6. 7.

*Arbor cheusanensis*, Arbuti foliis serratis. P. 25. Tab. 370, fig. 2.

*Arbor cheusanensis baccifera*, Frangulae foliis venosa, fructu parvo pyramidalis, calyculato, ossiculo oblongo binucleo. P. 25. Tab. 368, fig. 3.

*Arbor sinensis sebifera* Kieu-yeu. (I omit the detailed description.) P. 25. Tab. 390, fig. 2.

**Stillingia sebifera.** Michx. See above Phil. Trans. 90.

*Arbor sinica Pipa* dicta, folio Castaneae haud absimili. Arbor est flore albo rosaceo, plerumque pentapetalo, Ulmariae odore, staminibus apicibus farinaceis et nigricantibus, donatis. Ex calyce quintifido, lanuginoso et fusco surgit pistillum, quod deinde abit in fructum subrotundum, flavum, coronatum, fraga redolentem, pruni minoris magnitudine, nucleos continentem tres, aliquando duos, raro unicum, membrana communi tenui, ejusdem cum pulpa flavi coloris, et membrana propria fusca involutos. Flores in fasciculis nascuntur. Folia lanuginosa, ex acuta basi oblonga, latiora et serrata, versus summitatem, et in acumen desinentia. Nov. floret, fructus Majo maturescit. Cunningh. P. 26. Tab. 371, fig. 2.

**Eriobotrya japonica.** Lindl. See above Boym. 11.

*Arboris Pipa* altera species, non serrata, foliis viridibus, scabris. P. 27.

*Arboris Pipa* species altera, Quercinis foliis, *Cheusanica*. P. 27.

*Arbor Lauri folia*, floribus minimis ex albo flavescentibus. *Chusan*. Flores sunt odoriferi, Iridis Florentinae odorem spirantes, monopetali, quadrifidi, ad foliorum alas ex thecula cauli appressa, fasciculatim nascentes, pediculis longioribus (unde penduli apparent) stylo brevissimo, duobus staminibus brevissimis stipato; e calice prodeunte, qui abit in fructum. Sept. flor. A Sinis *Quei hoa* nuncupatur. Cngh. P. 27.

*Olea fragrans*. Thbg. V. supra Martini 20.

Eadem *Arbuti* foliis serratis. P. 27.

*Arbuscula baccifera sinensis*, Lauri folio, ad ortum foliorum bacca singulari, nigra, longo pediculo innixa. P. 27. Tab. 362, fig. 2.

*Arbuscula sinensis*; *Viburni* foliis. *Chusan*. P. 27.

*Arbuscula cheusanensis*, *Phillyreae* alternis foliis, baccis *Myrti* coronatis. *Myrtillus grandis cheusanensis*. P. 27.

*Arbuscula cheusan*. *Nerii* splendentibus foliis, aversa parte medio nervo plurimum extante, virgulis purpureis. P. 28. Tab. 365, fig. 5.

*Arbuscula cheusan*. *Salicis pumilae* angustioribus foliis, hirsutiae aurea pubescentibus, fructu parvo, in foliaceo conceptaculo pyramidali obvoluto. An *Cysti* genus? P. 28.

*Arbuscula sinensis*. Ulmi minoris folio, fractu nigro, testiculato, dicocco, racematim congesto. Ins. *Crocodil*. Kilcola Tsjetti. H. malab. X. tab. 57.—P. 28. Tab. 371, fig. 6 et 4.

*Arbuscula baccifera sinensis*, Lauri folio minore, fructu corymboso, summo capite coronato. *Tau eudda muram* indigenis dicta. P. 28.

I may observe that this is not a Chinese, but rather an Indian name.

*Arbuscula cheusanensis*, *Pyracanthae* majoribus foliis margine asperatis, spicas foliorum et seminum *Passerinae* minoris haud abludentium, ex alis emittens. P. 28.

*Arbuscula Myrtifolia sinensis*, foliis leviter crenatis, fructu calyculato, pyramidali. *Chusan*. P. 29.

*Arbuscula sinensis Myrti* majoris folio, vasculo seminali hexagono, ad singulos angulos alis foliaceis munito, quae porrectae, vasculi coronam efformant. *Um ki*, alias *u muy* Sinen-sibus dicta. Hujus semina tinctoribus inserviunt, iis enim ab indigenis optime tingitur, nobilis ille color, quem Escarlatinum nostrates vocant. Flos rosaceus albus, hexapetalus. Cngh. P. 29. Tab. 448, fig. 4.

Lour. Fl. cochin. 183 identifies this with *Gardenia florida* L., which at Shanghai is called 黃梔 *huang (wang) chi*

*Arbuscula Sinarum folliculifera*, Hypericis frutescentis foliis, folliculis longis, plurimis isthmis donata. P. 30.

*Arbuscula cheusanensis Aceri* Monspessulani folio, subtus rore coeruleo tincto, longo pediculo insidente. P. 32. Tab. 366, fig. 3.

Perhaps the same as Phil. Trans. 57 (see above) *Acer trifidum* Thbg.

*Arbuscula sinensis* Cisti minoris folio rigidiori parvo subrotundo, in brevius acumen desinente alternatim posito. Flores candicantes ex 5 vel 6 petalis seu laciniis angustis longioribus compositi, calyx quadrifidus. Flores in summitate ramulorum bini vel terni. Fructus ovatus, parvus, bivalvis, villosus, glandis ad instar calyculatus. Bina semine ovata. *Cheusan*. Cngh. P. 32. Tab. 368, fig. 2.

According to D.C. Prodr. IV 269 this is *Hamamelis chinensis* R. Br. observed by Abel (1818) in China.

*Arbuscula baccifera* spinosa, Persicariae foliis densis, triphylla, Lentisci modo rachi medio alata, fructu parvo, monopyreno, aromatico. *Wha tchaw* Sinensibus dicta. P. 33. Tab. 391, fig. 2.

*Zanthoxylum*. V. supra Philos. Trans. 74.

*Arbuscula sinensis*, Alaterni foliis et facie. *Chusan*. P. 33. Tab. 362, fig. 1.

*Arbuscula sinica*, baccifera, folio parvo, subrotundo, solidiori, Caryophylli aromatici fructu, rotundo, monopyreno et insipido. P. 34. Tab. 362, fig. 4.

*Arbuscula sinica* foliis argute denticulatis et incanis, Verbasci nigri Salvi folii aemulis, flosculis numerosis, ex foliorum alis. P. 34. Tab. 450, fig. 1.

*Arbuscula cheusanensis*, Laurinis pallidioribus foliis, ad summum ramulorum, in spicis plurimis erectis, julorum ad instar, flosculos ferens. P. 34. Tab. 369, fig. 2.

*Arbuscula sinensis Convolvulacea*, Staphylodendri aethiopici folio, lucido, bijugo, margine piloso. P. 34. Tab. 372, fig. 2.

*Arbuscula sinica* Cynoglossi foliis, incanis, quiddam in ramorum fastigio, foliolis sericeis, confertim stipatis compactile Rosae aemulum pro floribus ferens. Cuningh. In hortis Bonziorum colitur et *Ki heang* nuncupatur. P. 34. Tab. 371, fig. 1.

*Arbuscula Sinarum*, alternis minoribus foliis, non punctatis, floribus Aurantiae. P. 34. Tab. 365, fig. 1.

*Arbuscula Sinarum baccifera*, Salicis odoratae foliis glabris, leviter crenatis et laete virentibus, fructu rotundo monopyreno. P. 34. Tab. 369, fig. 1.

*Arbuscula Sinarum*, alternis foliis Arbuti, saturato virentibus et argute denticulatis. P. 35. Tab. 370, fig. 3.

*Arbuscula sinica* Rhamni cathartici fere foliis non serratis, fructu albo parvo, bivalvi, in calyce villosa pene immerso, ad foliorum ortus cum pediculis egrediente. P. 35. Tab. 361, fig. 2.

*Arbuscula prunifolia sinensis*, floribus parvis, pentapetalis, albis, summis ramulis racemosis. P. 35. Tab. 368, fig. 6.

*Arbuscula baccifera sinensis*, foliis Lauri alternatim sitis, fructu nigro molli, polypyreno, ex alis binatim cum pediculis exeunte. P. 35. Tab. 360, fig. 5.

*Arbuscula sinensis* Alaterni alternis brevioribus foliis, magis mucronatis, floribus pentapetalis albis, Oxyacanthi aemulis, in ramulorum fastigiis. P. 35. Tab. 362, fig. 3.

*Arbuscula sinensis*, Alaterni alternis, longioribus foliis, fructu Myrti solitario inter ramulos sparso. P. 35. Tab. 366, fig. 1.

*Arbuscula sinica*, Anonae dulcis folio minore non splendente. Folia alternatim brevissimis pediculis cauli adhaerent et singuli flores e foliorum alis cum brevibus pediculis egrediuntur. Flos est stamineus, minimus, calyce multifido. Fructus compressus, instar seminis Malvae, multicapsularis, plurima semina rubra, in bina serie per circumferentiam includente Cunningham. P. 35. Tab. 368, fig. 1.

*Phyllanthus puberulus*, Müll. var. *sinensis*. D.C. Prodr. XV 2. 307.

*Arbuscula cheusanensis*, Salicis caprariae folio rigidior, flore coerulesco, infundibuliformi, quadrifido. Folia ad basin et summitatem acuminata, superna parte viridi, inferna albo virescente, brevibus pediculis insidentibus. Cortice est tenaci. Augusto flor. Cngh. P. 36.

*Arbuscula Sinarum* Carpini foliis, fructu rubro, baccam mentiente. Flos 5 petalus, exterioribus petalis sub viridibus, veluti adhaerentibus, et 5 interioribus, ex luteo obscuris, ex cujus calyce, parum 5 fido surgit pistillum, quod deinde abit in fructum rubrum, baccae instar rotundum. Folia lanceolata, nervis bijugis, rectis, conspicuis, absque divisionibus, a medio nervo in folii latera protensis. Flores nascuntur in muscariis. Oct. floret. Cnghm. P. 36.

*Artemisia leptophyllos Sinarum*. Ins. Crocodil. P. 37. Tab. 353 fig. 2.

*Artemisia chinensis*, cujus mollugo moxa dicitur. Plukenet's Almagestum 50, tab. 15, fig. 1.

This is according to Lamarck. Enc. Bot. Suppl. I. 466. *Artemisia vulgaris* L. var. *indica*.

*Aster cheusanensis* Tripoli nostratis aemulus et forte idem. P. 40.

I may observe, that *Aster Tripolium*, L. is found in North-China.



*Aster cheusanensis coeruleus*, foliis subrotundis impense scabris, alternatim positis. Flores ex foliorum alis solitarii. Discus ex flosculis luteis multifidis, stamine bicorni praeditis, et corona ex semiflosculis coeruleis compositus est. Calyx squamosus, et semina pappis instructa. Oct. flor. Cnghan. P. 41. Tab. 373, fig. 3.

*Aster cheusanensis*, Virgae aureae scabris foliis, floribus coeruleis. Discus ex flosculis plurimis flavescentibus, corona vero ex semiflosculis coeruleis componitur. Flores insident cauliculis foliolis donatis, e foliorum alis prope summitatem egredientibus. Semina teretia, minuta, pappis instructa, et calyce squamoso comprehensa. Folia oblonga, acuminata, rigida, crenis raris notata alterna. Oct. flor. bipedalis. Cnghm. P. 42, Tab. 374. fig. 3. Idem floribus albis.

*Aster cheusan*. Virgae aureae alternis foliis, summo caule flore parvo singulari. P. 42. Tab. 373, fig. 4.

*Aster cheusan. luteus*, Lysimachiae siliquosae foliis, inferne villosis. Flos luteus, radiatus, discus flosculis luteis, corona quoque lutea. Calyx squamis longioribus. Folia alterna, oblonga, acuminata, superne pallide viridia, inferne incana et villosa. Sept. et Oct. flor. Cnghm. P. 48.

*Aster luteus cheusan*. Bliti majoris folio, paucioribus floribus, summo caule brachiato. P. 43. Tab. 373, fig. 5.

*Aster luteus cheusan*. Botryos folio, plurimis floribus, summo caule brachyato. P. 43. Tab. 410, fig. 3.

*Auriculae Ursi* affinis (*Androsace* dicta.), *sinensis*, *Saxifragae* aureae foliis, pediculis longis insidentibus. P. 43. Tab. 440, fig. 6.

See above Philos. Trans. 52.

*Blitum Kali* dictum sinense maritimum, album vermicularis et crispatis comis. Chamaepitys maritima. *Chusan*, Cnghm. P. 45. Tab. 375, fig. 1.

*Calamintha sinensis*, Ocymi folio et odore Sisymbrii. P. 48. Tab. 377, fig. 1.

*Calamintha montana cheusan*, Origani folio, odore Pulegii. P. 48. Tab. 377, fig. 6.

*Calamintha cheusanensis*, Pulegii odore, dentatis foliis, floribus dilute coeruleis ex longo, ramoso, brachiato caule prodeuntibus. P. 48.

*Campanula sinica*, Ocymi majoris folio, flosculis ad summitatem perexiguus. P. 49.

*Cannabis* sterilis s foemina nostras e regione Sinarum.

*Cardiaca* angustiori folio sinica, flore coerulescente et purpurascete. P. 50. Tab. 377, fig. 5.

*Cardiaca sinensis*, Ballotae foliis ex ins. *Crocodil*. P. 50.

*Carduo Cirsium Sinarum*, foliis magis spinosis, capitulo singulari. P. 51. Tab. 382, fig. 3.

*Cassiae Cinnamomeae*, Myrrhae odore Phytograph. similis ex insula *Cheusan*. P. 52. Tab. 381, fig. 2.

*Centaurium minus*, vulgari similis, ex insula *Sinarum Ukui san*, mense Junio collectum. P. 53. Tab. 381, fig. 1.

*Centaurium minus* Ascyroidis folio alterno, trapezii forma transparenti. *Cheusan*. Hinc folia ad caulem non sunt bina, sed alterno ordine sita. P. 53. Tab. 381, fig. 4.

*Centaurium minus Cheusanense* spicatum. Aug. flor. P. 53. Tab. 381, fig. 6.

*Cerasae Hottentottorum*, (quoad folia) haud absimilis, fructu coronato. *Cheusan*. P. 54.

*Chrysanthemum sinicum* Bellidis majoris folio, floribus parvis, in ramulorum fastigiis. P. 56. Tab. 383, fig. 6.

*Chrysanthemum minus*, Anchusae foliis, floribus parvis *Cheusan*. P. 56. Tab. 382, fig. 1.

*Chrysanthemum sinense* procumbens, Hyssopi foliis, pilis tenuissimis, margine fimbriatis. P. 56.

*Chrysanthemum*, Cannabinae aquaticae latiore folio indiviso. *Chusan*. Bidens seu Eupatorium aquaticum, folio serrato non diviso, flore flosculoso luteo, plurimis flosculis constante multifidis, embryoni insidentibus, foliolis membranaceis intermediis, et calyce folioso, cum foliolis membranaceis composito, comprehensis. Semen in duos desinens aculeos. Spt. flor. Folia bina, oblonga, ad basin et summitatem in acumen desinentia. Sinice: *mok teu tsaw*. Cnghm. P. 56.

*Chrysanthemum*, Conyzoidi Cannabinae simili, capitulis deflexis Almag. bot. 101, seu Asteri cernuo Fab. Columnae proxime accedens. *Cheusan*. Cnghm. (descriptio). P. 57.

*Chrysanthemum sinicum* minus angusto Calendulae folio, flore octopetalo luteo. P. 57. Tab. 383, fig. 5.

*Cichorio* affinis *Lampsana sinica*, Mentastri foliis, calyce fimbriato, hispido, flore luteo. Sin. *Hi him tsaw*. Sept. fl. Cnghm P. 58. Tab. 380, fig. 2.

*Sigesbeckia orientalis*. L. 猪簽 *hi hien*. I have omitted Cunningham's detailed description.

*Cistus Rhododendros*, sericeis foliis *cheusanensis*. P. 59.

*Cistus sinica*, Cisti Populi nigrae majoris foliorum aemula. P. 59.

*Cistus minor cheusan*. Salicis pumilae folio angusto et incano. P. 59. Tab. 379, fig. 2.

*Cistus humilis* seu *Chamaecistus* flore albo, vulgari similis, ex ins. *Crocodil*. P. 59.

*Clematis cheusanensis*, *Bucananthi* majoris fere foliis solitariis, ad margines spinosis serris, spica florum ampliori, ex foliorum alis. Planta repens flore purpureo violaceo. Sept. flor. in saxosis proveniens (I omit Cunningham's description.) P. 60. Tab. 384, fig. 1.

*Clematis arborea*, summo folio bicorni. *Chusan*. Hort. Malab. VIII. tab. 30, 31. *Naga mu valli*. P. 60.

The name here quoted is an Indian name for *Bauhinia scandens*. Comp. also above Philos. Trans. 80.

*Clematis minor maritima Sinensium*. P. 60.

*Clinopodium sinense* nostrati simile, sed minus. P. 60.

*Clinopodium* Origano simile. *Cheusan*. P. 61.

*Clinopodium cheusanicum* *Chamaedryos* folio majore. P. 61. Tab. 384, fig. 4.

*Clinopodium parvum sinicum*, hirsutis *Majoranae* foliis coronatum. *Majoranae* species, flore coerulescente labiato, cujus labium superius surrectum est, subrotundum bifidum, inferius vere tripartitum, foliis parum villosis. Sept. flor. Cnghm. P. 61. Tab. 380, fig. 4.

Gieseke identifies this with *Cometes alterniflora*. L., an Indian plant.

*Cocculi orientalis frutex* convolvulaceus, orbiculatis foliis, prona parte villosis. *Ins. Crocodil.* P. 61. Tab. 384, fig. 6.

*Convolvulus minor sinensis*, longiore hirsuto folio, flore albo parvo. P. 64.

*Convolvulus argenteus*, rectus *Sinarum*, spicae folius. P. 64.

*Coriotragematodendros* *Sinarum*, foliorum marginibus magis serratis. P. 65. Tab. 446, fig. 7.

*Corni* similis *cheusanensis*, bacca parva calyculata, striata, rubra, e foliorum alis binatim egrediente. Folia ex adverso bina subrotunda, acuminata. Baccæ rubrae, umbone peditæ binae, brevi pediculo et calyce integro insidentes, in pulpa molli et lutescente semina compressa, *Sesami* instar continentes. Sept. collegit Cnghm. P. 66. Tab. 385, fig. 5.

*Crotalaria cheusanensis*, spicae foliis argenteis, siliquis pro-pendentibus glabris, calycibus villis ferrugineis obductis in totum fere immersis. P. 67.

*Cupressus cheusanensis*, *Juniperinis* arcuatis foliis, clavis galbulorum eleganter cristatis. P. 69. Tab. 386, fig. 3.

*Cryptomeria japonica*. Don. See above Philos. Trans. 70.

*Doronicum Tussilaginis* folio, flore magno singulari. *Chusan*. P. 71. Tab. 390, fig. 6.

*Tussilago japonica*. L. (Giseke). Comp. above Philos. Trans. 31.

*Elychrysium Lithospermi* foliis. *Ins. Crocodil.* P. 72.

*Elychrysum angustifolium sinicum*, incanis foliis, floribus parvis sulphureis in capitulum congestis. P. 72.

*Equisetum nudum* non ramosum, asperum, fimbriis ciliaribus ad genicula cayaneis. Ins. *Crocodil.*

*Eryngii* species sinica, folio fere plano, trilobato et crenato, sin. *sha sin* dicta i.e. in arenis nascens. Ins. *Tau whey san.*

*Euonymo* nostrati similis, sed multo latioribus foliis. Arbor fragilis foliis subrotundis acuminatis et serratis, flore tetrapetalo, ex albo virescente, staminibus quatuor brevissimis, totidem apicibus purpureis donatis, calyce 4 fido, e quo surgit pistillum, quod deinde abit in fructum quadrangularem membranaceum, in 4 loculamenta divisum, singula continentia duo grana rubentia, sibi invicem appressa, foliis ex adverso binis, latioribus, serratis, in mucronem desinentibus. Fructu maturo, capsula purpurascit. Oct. perficitur. Cnghm. anno 1702. mense Novembri ex insula *Pu to* (east of Chusan.) detulit. P. 75.

*Euonymo* affinis *cheusan*. Frutex Laureoli foliis, solidioribus, tricapsularis et quadricapsularis, P. 76. Tab. 390, fig. 3.

*Euonymo* affinis *Sinensium*, tricapsularis, foliis subrotundis Lauri. Ins. *Crocodil.* P. 76.

*Euonymo* affinis *Sinarum* quadricapsularis, subrotundis, rigidis foliis dentatis, foliis et ramulis ex uno puncto quaternis P. 76. Tab. 392, fig. 3.

*Euonymo* affinis *cheusanensis*. Arbuscula staphylodendri nostratis folio, fructu gemello, bicapsulari. P. 76. Tab. 390, fig. 5.

*Euonymo* affinis *Pyracanthae* foliis. *Cheusan*. P. 76. Tab. 390, fig. 4.

*Euonymo* affinis *aromatica* s. *Zanthoxylum spinosissimum*, Fraxini angustiore folio punctatum. *Cheusan*. P. 76, Tab. 392, fig. 1.

*Euonymo* affinis *aromatica* s. *Zanthoxylum* latiore Fraxini folio conjugato, minus spinosum. *Chusan*. Frutex aromaticus arborescens, cujus truncus et rami spinis brevibus et tuberosis horrent, foliis Fraxini alatis, leviter serratis, perforatis, minime spinosis. Fructum fert in racemis unicapsularem laevem, virescentem et punctatum, seu perforatum, acerrimum Camphorae gustum sapientem, qui bifariam dehiscens, in apice semen ostendit unicum, nigrum, splendens, hilo angusto et obscuro notatum. Rami sunt medullosi et cavi, instar Sambuci. Oct. fructum perficit. Idem forte cum Herculis arbore nobis allata at ei quam proxime cognata. Forte Piperifera arbor Le Comte. P. 77.



*Euonymo affinis aromatica* s. *Zanthoxylum* Fraxini latiore folio sinuoso, medio nervo utrinque spinoso. Ins. *Crocodil.* P. 77. Tab. 449, fig. 7.

*Euonymo affinis aromatica* s. *Zanthoxylum* spinosum, Fraxinellae foliis cheusanicum. Frutex aromaticus, spinosus, spinis brevibus, foliis laevibus, perforatis, brevibus, in acumen desinentibus, costae per conjugationes innascentibus, impari claudente. Fructum fert unicapsularem, rotundum, scabrum vel verrucosum, acerrimum Camphorae gustum sapientem qui bifariam dehiscens, semen ostendit unicum, nigrum, splendens, nulli fere gustus, nisi oleosi. Fructus in racemis, Oct. maturescunt, sin: *Hoa tchaw* nominatur et vice Piperis utuntur. P. 78. Tab. 393, fig. 2,

According to Hooker and Arn. voy. Beech. 175 this is *Zanthoxylum nitidum* D.C.—Comp. also above Phil. Trans. 74.

*Euonymo affinis aromatica* seu *Zanthoxylum* sinicum spinosum, Cynorrhodi foliis et facie. Cunningh. P. 78.

*Euonymo affinis aromatica* s. *Zanthoxylum* cheusanense, spinosum minus, Rosae Pimpinellae foliorum aemula, cujus fructus forsan sunt Fagariae Clusii minores. Frutex aromaticus, spinosus, minor, foliis alatis non perforatis, leviter serratis, costa spinosa. Fructum fert ad ramorum summitates in fosciculos congestum, unicapsularem, laevem, virescentem et punctatum seu perforatum, gustus camphorati. Semen unicum, nigrum, splendens. Oct. fructus maturescit. P. 79. Tab. 391, fig. 3.

On the same page an account of *Tea* is found, which I omit.

*Eupatoria Conyzoides sinica*, Baccharidis folio rarius crenato, summo caule ramoso, floribus parvis coronato. P. 79,

*Eupatorium sinicum*, Leonuri africana foliis, flore ex albo coerulescente. Folia oblonga, serrata et acuminata. Florem fert album, flosculosum, plurimis flosculis companiformibus quintifidis constantem, ex quibus singulis longum surgit capillamentum, album, bifidum, quibusdam brevibus capillamentis nigris circumdatum, extra flosculum non prominentibus, unde flos apparet, quasi ex albo coerulescens, et calyce longo, tereti, et squamoso comprehensis. Semen nigrescens pappis instructum. Sept. floret. Cnghm. P. 82. Tab. 392, fig. 2.

*Eupatorium Conyzoides sinicum*, Tarraconis folio, capitulis argenteis. Flos radiatus, discus e flosculis luteis, corona vero e semiflosculis albis componitur. Calyx squamosus. Folia viridia, longa et angusta. Oct. flor. Cnghm. P. 82.

*Eupatorium Conyzoides cheusan.* Tarraconis folio, coma aurea amplissima. P. 82. Tab. 395, fig. 3.

*Euphrasia sinica* Parietariae foliis, Rubiae modo spicata. Flos albens, personatus. Labium sup. acuminatum et brevius, inf. vero tripartitum et longius. E calyce profundo multifido, surgit pistillum, quod abit in fructum seu testam oblongam, bifariam dehiscentem, in dua loculamenta divisum. Flores in spicis nascuntur. Folia ex adverso bina, Teucris similia. Cnghm. P. 83. Tab. 392, fig. 4.

According to Lam. Enc. Bot. I 629 this is *Justicia procumbens*. L.

*Euphrasiae affinis sinica*, Chamaedryos laciniatis foliis, Botrys instar, floribus purpureis, spicatis, amplis, longo et striato calyce exeuntibus. P. 84. Tab. 394, fig. 2.

*Euphrasia* Chamaedryos spuriae foliis ex ins. *Cheusan*. P. 84. Tab. 396, fig. 4.

*Euphrasia minor sinica*, Betonicae Pauli foliis, capsula longa, siliquam aemulante. Flos carneus personatus, labio sup. in acumen desinente, inf. vero trifido. Fructus est siliqua teres, bicapsularis. Semina minutissima. Folia bina, opposita, subrotunda, mollia et leviter serrata. Sept. flor. Cnghm. P. 84.

*Euphrasia parva* Thymi folio, procumbens, seu *Crataegonum minimum* Indorum, *Arrevenar-pundoe* Sinarum. P. 85. Tab. 404, fig. 3.

*Fagotriticum erectum* Sinarum, Persicariae folio, floribus in muscariis, calyce floris carneo, semine triquetro acuminato, spica floris brevi et multifida, foliis ex latiori basi in mucronem desinentibus, ad nodos alternatim positos, rarioribus. Sept. Oct. flor. *La leou* sinice nuncupatur. Cnghm. P. 86. Tab. 398, fig. 2.

The Chinese name 辣蓼 *la liao* is applied to several species of *Polygonum*.

*Fagotriticum rectum sinense*, Convolvuli minoris folio ad caulium nodos, appendicibus pilosis auriculato. Persicaria calyce floris albo, flores in ramulorum summitatibus in muscariis disponuntur. Semina fusca, triquetra et acuminata. Folia lanceolata, aurita ex nodis alternatim nascentibus, nodum verum aliud plerumque foliolum subrotundum hirsutum quasi amplectitur. Palustribus gaudet. Oct. flor. Sin: *Ya tien tching*. Cnghm. P. 86. Tab. 398, fig. 4.

*Fagotritici similis spinosa minor sinica*, cauliculis erectis. Persicaria calyce floris rubente, foliis lanceolatis auritis et angustioribus, caulibus et ramibus spinosis, semine nigro splendente, triquetro et acuminato. In palustribus. Cnghm. P. 87. Tab. 398, fig. 1.

Linnaeus identifies this with his *Polygonum perfoliatum*.

*Ficus arbor nostrati similis*, fructu nigricante. Ins. *Crocodil*. P. 87.

*Filix* Adianto nigro officinarum similis pediculo viridi, pinnulis magis eleganter incisis. *Cheusan.* P. 91. Tab. 403. fig. 2.

*Adiantum pallens.* Sw. V. Lam. Enc. Bot. suppl. I. 138.

*Filicis* non ramosae genus, pinnulis latius dentatis. *Ins. Crocodil.* P. 92. Tab. 401, fig. 2.

*Filicis* folia, *Lonchitidis* facie sinensis, ad pinnularum nervos lincolarum ferruginearum duplicem ordinem dorsigerens. P. 93. Tab. 399, fig. 3.

*Filix cheusanica*, latiori *Lonchitidis* serrato folio, aversa parte ferrugineis punctulis refertissimo. P. 93. Tab. 405, fig. 1.

*Filicula* s. *Bryopteris* repens Sinarum, inter *Filicem* et *Lycopodium* compos., pinnulis aversa parte micis argenteis ornatis. P. 93. Tab. 400, fig. 3.

*Filix Phyllitis* dicta minima *cheusan.* aversa parte globulis binis ordinibus per longitudinem foliorum instructa. P. 93. Tab. 405, fig. 4.

*Filix minor sinica*, foliis integris et trifidis, aversa parte punctis ferrugineis rarius interspersa. P. 93. Tab. 404. fig. 1.

*Filicula cheusanica* s. *Hemionitis* multifido folio tenuissime serrato, ad margines seminifera. P. 94. Tab. 407, fig. 2.

*Pteris crenata.* Sw. (Lam. Enc. Bot. V. 715).

*Filix sinica* Smyrni cretici facie, perelegans. P. 94. Tab. 398, fig. 6.

*Frutex cheusanensis* Bardanae majoris folio minore, *Sambucum* olens, floribus Jasmini odoris. Cnghm. in hunc modum describit: Frutex est flore albo, monopetalo, infundibuliformi, tubo longiore 5 fido, stylo staminibus productionibus stipato, abeunte in fructum mollem, seu baccam rotundam coeruleam, plerumque dipyrenam calyce insidentem 5 fido, ex virido purpurascente. Folia fert bina, lata, in acumen desinentia et pediculis longis insistentia. Sept. Oct. flor. P. 96. Tab. 411, fig. 1.

*Frutex sinensis prunifolius*, denticulis ad marginem spinosis, aversa parte parum villosis. P. 96. Tab. 409, fig. 3.

*Frutex cheusanensis* Myrti folio, flore albo hexapetalo, Jasmini odore fragrantissimo. P. 96. Tab. 409, fig. 1.

*Frutex sinensis* Myrtinis foliis pallentibus, alterno ordine dispositis. P. 96. Tab. 411, fig. 5.

*Frutex sinensis baccifer*, Ligustri foliis, fructu parvo, rotundo nigro monopyreno, calyce donato. P. 97. Tab. 407, fig. 1.

*Frutex sinicus* non spinosus, baccifer, *Pyracanthae* foliis majoribus, fructu parvo, rotundo, polypyreno. P. 97. Tab. 411, fig. 4.

*Frutex cheusanensis baccifer*, Theae foliis, laete virentibus, flosculis parvis virescentibus, plurimis simul ad foliorum ortus, ex calyce squamoso prodeuntibus. Frutex est flore 5 petaloide, petalis reflexis, squamatim nascentibus. Pistillum 4 fidum, quod deinde abit in baccam purpurascentem. Novb. flor. Cnghm. P. 97. Tab. 411, fig. 2.

*Frutex cheusanicus* floribus Theae ex albo carneis, fructu unicapsulari, capsula trifida. Foliis Theae sed non in usum adhibendis. Cnghm. P. 98. Tab. 409, fig. 2.

*Frutex sinensis* Alaterni longioribus foliis dilute viridibus, flosculis plurimis squamosis, ad ortum foliorum cauli appressis. P. 98. Tab. 406, fig. 2.

*Frutex cheusanensis baccifer*, Celastri foliis rarius dentatis, flosculis parvis, virescentibus, plurimis simul ad foliorum ortus, ex calyce squamoso racematim enascentibus. Proxime praecedentis forte species est. Frutex est flore pentapetaloide, petalis ex luteo virescentibus, fundo purpureo; ad divisuras petalorum prodeunt stamina breviter ex luteo virescentia. Pistillum virescens abit in baccam calyci hexaphyllo insidentem. Folia crassa, laevia subrotunda et acuminata, crenis raris, leviter incisa. Nov. flor. Cnghm. P. 98. Tab. 407, fig. 4.

*Frutex sinensis* Uvae ursi longioribus foliis, leviter crenatis. Ins. Crocodil. P. 99. Tab. 435, fig. 8.

*Frutex sinensis* Majoranae minoribus foliis, prona parte candidantibus venis pullis e directo, et lineolis transcurrentibus elegantissime delineatis. Chusan. Cnghm. P. 100. Tab. 408, fig. 3.

*Rhamnus lineatus*. L. See Lam. Enc. Bot. IV. 473. *Berchemia lineata*. D.C.

*Frutex sinensis monococcus*, Rubi foliis parvis, viticulis spinulis asperatis. Chusan. An Rubus monococcus saxatilis alpinus? P. 101.

*Frutex spinosus baccifer* Sinarum, foliis Pentaphylli quinquefidis. P. 101. Tab. 409, fig. 4.

*Frutex sinensis baccifer* convolvulaceus Cisti foliis pubescentibus ad ramulorum nodos confertis. Mareta Inali. Hort. Malab. XI. tab. 63.—P. 101. Tab. 416, fig. 3.

*Frutex convolvulaceus spinosus sinicus* rotundiore nervoso folio, floribus parvis, umbellatis, claviculis ligneis binatim donatus. P. 101. Tab. 408, fig. 1.

*Smilax China*. L. V. Maxim. Decad. X.

*Frutex cheusanensis* conifer, foliis Juniperi planis et teretibus Cupressi. Cnghm. P. 102.

Probably *Juniperus chinensis*. L.

Fruticis Theae species altera Sinarum. P. 102. Tab. 405 fig. 3.

*Thea viridis* (Giseke).



- Fumaria sinica* foliis Chelidonii modo laciniatis. P. 102.  
*Fumaria siliquosa*, nodosis siliquis. *Cheusan*. P. 102.  
*Galeopsis cheusanensis* spicata, Sideritidis folio et facie. P. 103.  
*Galium minus cheusanicum*, locis uliginosis. P. 104.  
*Gentiana major* aphyllis, adunco flore purpurascens. *Cheusan*.  
 Planta flore Digitalis purpureo absque foliis e terra prorumpens. Cnghm. P. 105.  
*Gnaphalii minoris* genus sinense. Ins. *Crocodil*. P. 107.  
*Gramen cyperoides* capillaceis foliis pusillum. Ins. *Cheusan*.  
 P. 110. Tab. 417, fig. 8.  
*Cyperus tenellus*. L. Comp. Roem and Schult. Syst. II. 167.  
*Gramen panicum* polystachion sinicum, binis granorum ordinibus, et binis granis in eodem ordine, uno versu constante. *Cheusan* Sept. 20. 1702. Cnghm. Varrigo tawly Malabareis. P. 110. Tab. 417, fig. 7.  
*Gramen cyperoides cheusan*. tricephalon, globulis echinatis. P. 112.  
*Gramen Cyperoides parvum* sinicum, capitulo globoso, ad summum caulem inter quatuor foliola sessili. P. 112.  
*Hedera arborea cheusanensis*, vulgari similis, sed foliis perangustis. P. 114. Tab. 415, fig. 5.  
 Comp. Philos. Trans. 77.  
*Hedera cheusanensis* Glycyrrhizae foliis rigidioribus. P. 114. Tab. 416, fig. 5.  
*Hieracium cheusanicum*, Rapistri foliis glabris, ramoso caule, floribus parvis luteis. Flos radiatus, Discus ex flosculis lutescentibus et fuscis 5 fidis, corona e semiflosculis luteis octo plerumque composita. Folia laevia et laciniata. Planta 4-5 pedum alta. Nov. flor. Cnghm. P. 117.  
*Hieracium cheusan*. Sonchi laciniatis folio. Flores in ramulorum fastigiis lutei. Oct. flor. Cnghm. P. 118.  
*Horminum sinense* triphyllon, Caryophyllatae foliis, spica florum Galeopseos Dioscor. Planta flore purpureo violaceo labiato, piloso, cujus labium sup. falcatum est, infer. vero in 3 partes divisum, media Cochlearis instar excavata, cum duobus vel tribus staminibus versus labium sup. prodeuntibus. Calyx parum pilosus purpurascit et quasi labiatus, cujus labium inferius bifurcatum. Folia Betonicae similia versus radicem ex uno pediculo terna. Sept. flor. Cnghm. P. 119. Tab. 410, fig. 6.  
*Hypericum Ascyrum* dictum *Cheusanense*, gummiferum, flore rosaceo, longissimis foliis, theca seminum pyramidata ex calyce polyphylo 5 capsulari, gummi subflavum et lucidum Mastiches instar fundente. Semina oblonga et exigua. Folia fert absque

pediculis, e regione bina, angusta, longiora et laevia, caule quadrangulo. Planta 3-4 ped. alta. Cnghm. P. 120. Tab. 420, fig. 4.

*Jacobaea sinica*, Irionis Apulae folio. *Chusan*. P. 121.

*Jasminum japonicum* Blattariae foliis latioribus ex adverso binis, subrotundis, acuminatis et serratis, floribus absque calyce tetrapetalis vel pentapetalis coeruleis, umbilico purpurascens, summo caule in umbellam sitis. Majo, Junio floret. Ex Japonia. Sin: *Seu kiu hoa* dicitur. Cnghm. P. 122.

繡 毬 *Siu kiu* is the Chinese name for several species of *Hydrangea*.

*Jasminum sinense* foliis venosis, floribus purpureis, Shetti instar, longissimo tubo donatis. Ins. *Crocodil*. Cnghm. P. 123.

*Ilex cheusanensis*, Lauri folio leni, subtus incano, glande parvo et prae laevore nitente, calyce rugoso. Cnghm. P. 123.

*Ilex Sinarum*, longioribus foliis, a summo ad medium usque in margine serratis. *Chusan*. P. 123.

There is an *Ilex* among the plants gathered by Cantor in Chusan.

*Juncus sinensis* paniculis parvis conglobatis, acumine singulari, integro. P. 124.

*Juncus parvus sinensis*, panicula sparsa, caule foliaceo compresso. P. 124.

*Juniperi folia arbuscula cheusanensis* conifera, foliis variis Cupressi squamosis et Juniperinis. Cnghm. P. 125.

Carrière (Conif. 151). identifies this with *Glyptostrobus heterophyllus*. Endl. But it seems to me, that this short diagnosis agrees as well with *Juniperus Chinensis*. L.

*Kali spinosum cochleatum sinicum*. Planta maritima ramosa, foliis teretibus in aculeum desinentibus, alternatim positis, caulibus rubentibus et striatis. Flores foliorum alis singuli, aliquando bini adhaerent, et versus ramorum cacumina in spicam quasi depositi. Flos primo aspectu pentopetalos apparet, fundo incarnato, petalis albis, rigidis, membranaceis, quorum tria fere cordiformia et duo magis angusta (strictè loquendo seminis involucrum; staminibus caret.) sed revera monopetalos, 5 fidus. In fundo floris vero, et membranaceo, quasi capsula conspicitur semen unicum rotundum. Floris calyx quasi campaniformis et squamosus, plerumque 4 fidus, aut 5 fidus, in aculeos inaequales desinens. Oct. flor. Sin: *sha sin* i.e. in arenis nascens. Ad oram maritimam insulae *Tow whey san* (v. supra) provenit. *Kali spinoso* vulgari haud absimile. Cnghm. P. 126.

*Kali* (forte) Genus herba *sinensis*, rotundiore Bliti folio, striato caule ad genicula plurimis barbulis ornato. *Toundepundoe* Sinensibus dicta. Huic autem haud parum convenire

videtur *Anonymos* nostra americana foliis *Parietariae* scabrae etc. Phytogr. tab. 136, fig. 4.

I need not say that Tounde pundoe is not a Chinese name.

*Lamium purpureum cheusan.* seu *Galeopsis*. Vide supra *Hormium* sin. P. 129. Tab. 410, fig. 6.

*Lavandulae* facie planta aromatica, argenteis foliis ex ins. *Crocodil.* An forte *Aster africanus* frutescens, *Lavandulae* folio, flore purpureo. H. Amst. part. all. 57.—P. 130.

*Lavreola sempervirens cheusanica*, floribus ex albo virentibus. *Jasminum humile* erectum flore albicante, foliis integris. Cnghm. P. 130.

*Laurifolia pomifera* e regione Sinarum. P. 130. Tab. 424, fig. 5.

*Laurus cheusanensis* aromatica, *Camphoriferae* haud abludens, foliis subtus rore coeruleo tinctis. P. 131.

*Lupulus foemina cheusanensis* florens solummodo et non fructum ferens.

*Humulus japonicus*. S. et Z. See above Mus. Petiv. 944.

*Lychnis ramosior cheusan.* purpureo flore multifido, calyce longo striato. P. 135.

*Lychnis sinensis* angustis foliis multiflora, capsulis rotundis, glabris. Ins. *Crocodil.* P. 135. Tab. 427, fig. 3.

*Lycium Myrsinites Sinarum*, spinis longioribus bijugis, foliis lanceolatis, laevibus et obscure viridibus, ex adverso binis, absque pediculis, bacca rubente coronata, duo vel tria semina continente. Ins. *Pu to*. In Bonziorum hortis colitur, sin: *hu tsu* dicitur. Cnghm. P. 136. Tab. 426, fig. 3.

In Japan as well as in China (Peking) the name of 虎刺 *hu ts'z'* is applied to *Damnacanthus indicus*. Gaert.

*Lycii* similis frutex sinensis, *Buxi* foliis subrotundis et lanceolatis, leviter serratis, plerumque binis et ramulis alternatim nascentibus, flore minimo amentaceo, in muscariis et spicis verticillatim disposito, calyce multifido. Oct. flor. Cnghm. P. 138. Tab. 426, fig. 1.

*Lysimachia siliquosa* minor, villosis foliis, flore purpureo. *Cheusan.* Nostrati forte sit villosior, alio quin haud differt. P. 138.

*Lysimachiae spicatae Ephemerum* dictae similis sempervirens. *Cheusan.* P. 138.

*Malva cheusanica*, coeruleis floribus, ad caulis intervalla semiverticillatim positis. P. 140.

*Malva verticillata*. L? Common in China.

*Marrubium aquaticum sinense*, *Ambrosiae Mexicanae* foliis inodoris. Planta verticillata, flore labiato, foliis serratis oblongis

Stachydis, caule quadrato. Sin: *Tchu sin* dicta. In hortis Bonziorum colitur. Ins. *Tow whey san* (v. supra). Cnghm, P. 142.

*Matricaria sinensis*, minore flore, petalis et umbone ochroleucis. P. 142. Tab. 430, fig. 3.

Linnaeus identifies this with his *Chrysanthemum indicum*.

*Melilotus sinensis* elatior, vulgari haud absimilis. P. 143.

*Menthae cheusanensis* spicata, Lysimachiae foliis, inodora. P. 144. Tab. 430, fig. 5

*Menthae cheusan.* verticillata, longiore et acuminato folio, odoris Menthae, camphoram resipiens. Flore ex albo coerulescente. Sept. floret. Alia est ejus species, gustus magis acris, sinice vocatur *po ho*. Cnghm.

The Chinese name 薄荷 *po ho* is applied to *Mentha arvensis*. L.

*Menthae spicatae* similis Sinarum. Nepetae minoris folio serrato, villosa, moschum olente, spica florum quaterno ordine, foliacea, monocarpus. Flores coerulescentes. Oct. flor. Cnghm. P. 145. Tab. 430, fig. 1.

*Mercurialis cristatus* minor procumbens. *Cheusan*. P. 145.

*Muscus clavatus* erectus crispatis foliolis, Spongiolae imitamentum. *China*. P. 149. Tab. 431, fig. 3.

*Lycopodium cernuum*. L. (Giseke).

*Myrtus sinica* latiore et crassiore folio, caule nodoso, ad cymum ramulorum flores emittens. P. 151. Tab. 433, fig. 4.

*Nasturtium aquaticum minus cheusan.* surrectum. P. 151.

A long confused dissertation on *Ninzin* seu *Ginseng* is found on p. 152.

*Ocimum Melissophyllum sinicum*, foliis longis, superius magis, inferius minus villosis serratis, flore ex albo purpurascente, labiato, cujus labium sup. parum surrectum est, vix bifidum, inf. vero tripartitum medio lobo puncto luteo notato. Flores nascuntur in spicis quadrangvlaribus, foliolis inter flores squamatim emanantibus. Oct. flor. Cnghm. P. 158. Tab. 429, fig. 8.

*Ocimum Melissophyllum sinicum*, foliis magis mucronatis laevibus, serratis, Urticae similibus, caulibus quadratis et parum villosis, suavem Menthae odorem omnia spirant. Flos albus brevi tubulatus, vix labiatus, lab. sup. 2 fido, inf. 3 fido, medio puncto luteo notato. Flores in spica laxa nascuntur. Sept. flor. Sin: *Ssu tse* vocatur. Cnghm. P. 159. Tab. 429, fig. 7.

At Peking *Perilla ocymoides* L. is termed 蘇子 *su ts'z*

*Olea sylvestris* s. *Zizyphus* Indiae orientalis spinosa. Illicis suberiferae folio duro, subtus argenteo et punctato. *Cheusan*. P. 160.



*Olea sylvestris* s. *Zizyphus cheusanensis* non spinosa, foliis subtus argenteo molli, fructu rotundo rubente, punctulis notato. Frutex est flore argenteo punctato, monopetalo infundibuliformi tubulato quadrifido, baccis rubentibus rotundis et punctatis, acidiusculis et esculentis, monopyrenis, sinensibus *Pai by* dicta. Alia est ejus species fructu oblongo. Cnghm. P. 160.

It seems that the *Jujube* is meant, but the Chinese name given is wrong.

*Onobrychis cheusanensis*. Trifolii bituminosi foliis, alatis pediculis, triphyllis, oblongis acuminatis, siliquis asperiusculis, compressis et parum incurvis, semine foetis in singulis articulis, unico oblongo et compresso. Oct. fructum perficit. Cnghm. P. 160. Tab. 433, fig. 8.

*Onobrychis cheusan*. floribus spicatis, foliis ternis, subrotundis amplioribus. Hedysarum triphyllum, flore ex albo purpurascete, in spicis laxis ad caulium summitates nascente, siliqua laevi et compressa, falcatis unico internodio distincta et siliculae cuspe acuta unci instar reflexa. Sept. flor. Cnghm. P. 161. Tab. 433, fig. 2.

*Onobrychis sinica* trifoliata Hedysarum triphyllum minus, siliculis hirsute pubescentibus, articulatis, uno latere undulatis, altero rectis, in spicam congestis, seminibus reniformibus. Cnghm. P. 161.

*Onobrychis sinica* Serpylli minimi hirsuti foliis triphylla, flore ex albo coerulescente, siliculis utrinque undulatis, compressis. Semina plana reniformia. Sept. flor. Cnghm. P. 162. Tab. 433, fig. 6.

*Papaver corniculatum* acre monophyllum, Valerianae rubrae folio angustiore. *Cheusan*. P. 166.

Plukenet means *Chelidonium corniculatum*. L.

*Parietariae* affinis *Chamaedryos* folio herba sinica, flosculis confertis circa caulem ex foliorum alis, flore apetalis, staminibus brevissimis, albis, extra calycem multifidum protensis, cui innascitur semen 3 angulare. Sept. floret in lapidicinis provenit. Cnghm. P. 166. Tab. 438, fig. 2.

*Pedicularis cheusan*. Geranii moschati foliis, flore carneo. P. 166. Tab. 439, fig. 7.

*Pentaphylloides Sinarum* foliis subtus argenteis, flore aureo guttato. P. 166. Tab. 435, fig. 5.

**Potentilla.**

*Periclymenum cheusan*. surrectum, Salicis folio non serrato. *Jasminum arboreum cheusan*. Cnghm. P. 167.

*Periclymenum erectum sinense* Frangulae foliis. P. 167. Tab. 435, fig. 4.

*Periclymenum herbaceum cheusan.* erectum, Circaeae majoribus foliis mollibus, incanis. P. 167. Tab. 438, fig. 3.

*Periclymenum scandens hirsutum sinicum*, subrotundis foliis binis, oppositis. Caprifolium flore minore ex albo flavescente tubulato in duo labia dehiscente, quorum sup. 4 fidum, inf. linguiforme recurvum. Flores prodeunt plerumque bini, ex foliorum alis et caulium summitatibus, cum duobus foliolis, eorum calycibus adnexis. Calyci vix conspicuo insidet bacca rotundo semine foeta. Sept. floret. Sin: *Kin in hoa* i.e. flos auro argenteus. Cnghm. P. 167. Tab. 435, fig. 1.

In China *Lonicera chinensis*. Wats. is called 金銀花 *Kin yin hua*.

*Persicaria cheusan.* Lapathi foliis, calyce floris ex rubro purpureo, spica rigida, rara, longiori. Sin: *loon king*. Cnghm. P. 168. Tab. 436, fig. 5.

*Persicaria cheusan.* foliis subtus argenteis, spica florum elegantiori. P. 168. Tab. 436, fig. 6.

*Persicaria minor multicaulis.* Ins. *Crocodil.* P. 168. Tab. 436, fig. 3.

*Persicaria sinensis*, longioribus et angustis foliis. *Cheusan.* P. 168. Tab. 436, fig. 1.

*Persicaria pusilla Sinarum*, angustissimis foliis, spica rara gracili. P. 168. Tab. 436, fig. 4.

*Phalangium ramosum* flore parvo longo gracili. Ins. *Crocodil.* P. 168.

*Phillyrea Myrsinitis Sinarum.* P. 171.

*Planta peculiaris longioribus foliis*, Cepeae Pancii capitulis papposis. *Cheusan.* P. 172.

*Planta cheusanica tenerifolia*, unicaulis triphylla, spithami plerumque longitudine, fructum fert absque flore in caulis summitate, ovatum, nucleo similem, membrana tenui inclusum, acrem radice Ari gustum referentem, et alterum ejusmodi fructum cauli prope radicem, ad terrae superficie appressum. Oct. 1702 collegit. Cnghm. P. 174.

*Prunifera Elaegni foliis*, sin: *Yang muy* dicta, fructu hispido fraga redolente. In vino destillato toto anno conservant. P. 178.

*Myrica sapida* Wall. Comp. above Semedo 6.

*Pulegii vulgaris species Sinarum*, herba capsularis, pluribus capsulis ad nodos junctis, caule quadrangulati. *T'ounde Chedde* a Sinis nominatur. P. 179. Tab. 439, fig. 2.

*Pyracanthae similis Sinarum*, foliis rotundioribus, subtus leviter tomentosis. Ins. *Crocodil.* P. 179.

*Pyrolae nostratae similis*, serratis foliis. *Planta sinica*, baccata, monoppyrena, ad pedalem altitudinem vix assurgens,

non ramosa, foliis Cerasi, ex adverso binis, fructu rubro, rotundo, caudato, semine unico, calyce 5 fido. Nov. maturescit. Cnghm. P. 179.

*Pyrola frutescens*, Arbuti folio. *Cheusan*. P. 179.

*Quercus julo* rotundo, calyce echinato, glande minore laevi. *Cheusan*. Cnghm. P. 180.

*Quercus* (forte.) *cheusanensis*, Castaneae minoris folio prona parte candicante. P. 180.

See above Philos. Trans. 87.

*Quercus cheusan*. minoribus et serratis foliis hirsutis. P. 180.

*Rapuntium minimum cheusan*. Campanulae autumnalis folio et facie, flore Lini coeruleo, pentapetaloide, cujus pistillum abit in vasculum 3 capsulare, campaniforme. Sept. flor. Cnghm. P. 181.

*Rapuntii parvi species altera cheusanensis*. Flore ex carneo purpurascente, monopetalo, anomalo, tubulato et sulcato, in 5 partes linguiformes digitatim diviso, extremis longioribus et angustioribus, vagina ad basim 3 fida excipit et amplectitur pistillum ad summitatem. Calyx 5 fidus. Semina exigua rotunda. Folia fert Alsines fere similia, alternatim posita et leviter serrata. Sept. flor. Cnghm. P. 181.

*Rhamni cathartici* similis, longioribus foliis, fructu nigro dipyreno, ex insula *Tow whey san*. Frutex est bacca nigra rotunda, umbone notata, succo lutescente, instar *Rhamni cathartici*, praedita, et duobus seminibus callosis, gibbosis et quasi cylindraceis foeta, foliis oblongis et obtusis, leviter serratis, spinis rarioribus et longioribus donatus. Oct. fructum matur. Cnghm. P. 182. Tab. 408, fig. 2.

*Rhamno* nostrati cathartico accedens minor. Ins. *Cheusan*. P. 182. Tab. 408, fig. 4.

*Rhamnus cheusan*, cortice albo, Berberidis instar fructum ferens calyculatum. Frutex est spinosus, flore superius purpureo parum striato, inferius ex viridi et albo purpurascente, hypocrateriformi multifido, 5 partito, plerumque tubo breviori, ex cujus calyce 4 fido surgunt stamina alba cum pistillo, quod abit in fructum mollem, seu baccam rubram ovatam, polypyrenam. Sept. flor. Cnghm. P. 182.

*Rhamnus Pruni sylvestris* folio *cheusan*. cortice querno, validioribus foliatis spinis, bacca minore nigra, unicum intus semen claudente. P. 183. Tab. 427, fig. 4.

*Rhamnus sinensis* flore coeruleo, ex oris maritimis ins. *Cheusan*. P. 183.

*Rhus quinquefolia Sinarum*, lactescens, rachi medio alata, foliis molli hirsutiae pubescentibus. P. 183.

Miller identifies this with his *Rhus chinensis*. Comp. also above Philos. Trans. 89.

*Rorella parva cheusan.* nostrati similis, caule folioso. P. 184.

Plukenet means *Drosera*.

*Rosa sylvestris cheusan.* foliis subtus incanis, floribus purpureis parvis. P. 185.

*Rosa alba cheusan.* foliorum marginibus et rachi medio spinosis.

*Rubia sinica*, fructu majore nigro, foliis partim Galii stellatis, partim Smilacis aspere effigie scabris. P. 185. Tab. 441, fig. 3.

*Rubia quadrifolia aspera*, baccis numerosis, singularibus, nigris, succulentis, semine unico, rotundo, umbilicato foetis. Nov. collecta. Cnghm.

One of these two species is probably *Rubia cordifolia*. L. But the fruit of the latter is of a brown colour, when ripe.

*Rubus sinensis non spinosus triphyllus*, floribus parvis rubropurpureis. P. 186.

*Rubus parvus spinosus*, foliis subtus canescentibus ex insula Emoy. P. 186.

*Rubus odoratus minimus sinensis*, cauliculis asperis provolutis. P. 186.

*Scabiosa graminifolia nudicaulis*, capitulis argenteis, sive *Statice minima elatior Sinarum*. P. 188.

*Scorodoniae affinis Sinarum*, floribus ex albo purpurascentibus, spica florum compactiore. Flore monopetalo, labiato, cujus stamina labii sup. locum occupant, labium vero inf. in 5 partes dividitur, media ampliori, et Cochlearis ad instar excavata, ceteris in floris cervice e regione positis. In calyce 5 fido reconduntur 4 semina subrotunda et oblonga. Sept. flor. Cnghm. P. 188. Tab. 441, fig. 2.

*Scutellaria sinica Betonicae folio*, floribus albis. P. 190. Tab. 441, fig. 1.

Linnaeus identifies it with his *Scutellaria indica*.

*Scutellariae accedens cheusanensis* Ocymsi folio, flore ex albo purpurascente, semine singulari. Flore intus purpureo, exterius ex albo purpurascente, monopetalo, infundibuliformi, 4 fido, leviter inciso, tubulato, tubo incurvo. Ex calyce brevi, multifido, surgit pistillum, quod deinde abit in semen unicum ovatum, extra calycem prominens. Folia bina, oblonga, acuminata, superne laete, inferne pallide viridia. Flores in spicis. Sept. Oct. flor. Cnghm. P. 191. Tab. 443, fig. 3.

*Scrophularia minor sinica*, Betonicae subrotundis foliis. P. 190.



*Sena spuria sinensis*, Mimosae foliis minimis, floribus parvis, magis expansis. Ins. *Crocodil.* P. 193.

*Sium minimum* umbellatum sinicum. Flore albo rosaceo, umbellato, ex 5 petalis subrotundis, in orbem positis et 5 staminibus composito, calyce insidentibus. Fructus e duobus seminibus compositum, subrotundis, crassis hinc gibbis et profunde striatis. Folia brevissima, crassa, costae per conjugationes innascentia, ultimo impari claudente trifido et pinnis aliquando trifidis. Ex insula *Pum si san.* Oct. flor. Cnghm. P. 193.

*Siler* Aquilegiae foliis angustioribus. Ins. *Crocodil.* P. 193.

*Smilacis asperae* seu *Zarzae* latis *Canellae* foliis. Planta claviculata, pediculis foliorum vaginatis, *Cynorrhodi* fructu, profundius striato, *Mali punici* ad instar, tubulo brevi pergameno, summa parte coronato. Ins. *Crocodil.* P. 194. Tab. 438, fig. 7.

*Solanum mordens sinicum*, *Berberidis* fructu singulari, viticulis suis spinis longioribus aculeatum. P. 195. Tab. 443, fig. 2.

*Sorbi* species *Sinarum* Cucurbitiferae *Panorama* dictae (Almag. bot.) foliis, aculeato caudice. Frutex est spinosus, scandens, baccis rubris rotundis in umbellae modum dispositis, in pulpa subrubra, succulenta, gustus parum acidi et adstringentis latent semina ossea plura, inaequalis figurae, plana vel convexa, circa axem seu placenta disposita. Folia *Polygonati* fere, sed circinatae rotunditatis, singulas foliorum et ramorum divaricantium insertiones duo amplectuntur foliola, in cirros plerumque terminantia. Nov. fructum perficit. Cnghm. P. 196. Tab. 444, fig. 3.

On pag. 198 of Plukenet's *Amalth.*, sub *Tamarindus monococos*, the author suggests, that the celebrated *Soy* of the Chinese and Japanese, (made as is known from the *Soja*-bean, *Soja hispida* Moench.) may be obtained from the seeds of *Tamarind*, of which he gives a drawing. Tab. 441, fig. 4.

*Tetraglottis baccifera Sinarum* seu *Ligularia arbor sinensis*, *Gossypii* quinquefidi amplioribus foliis, quatuor ligulas foliaceas, longo pedunculo ex alis insidentes, pro floribus ferens, e ligularum margine baccifera. *Ou tom chu Sinarum*. P. 199. Tab. 444, fig. 4.

*Sterculia platyfolia*. Cav. See above *Philos. Trans.* 82.

*Teucrium cheusan.* folio molli, incano, subrotundo. serrato, flore coeruleo, monopetalo, labiato, cujus lab. sup. parum fornicatum, surrectum, et fimbriatum, infer. vero 3 fidum. Calyx 5 fidus. Semina 4, triangularia, fusca. Flores in umbella quasi dispositi. Nov. flor. Ins. *Pu to.* Cnghm. P. 200.

*Triapteris Sinarum*, Hederae folio, scandens, fructu minore. P. 202.

*Triapteris Sinarum*, Tiliae fere foliis alternis, ad genicula fructum fasciculatim proferens, monospermum, semine, triquetro, nitente, nigro. Vasculum seminale cordiforme, ex tribus alis membranaceis, sagittae extremitatis instar conflatum in medio semen unicum nigrum includens. Caulis nodosus et fistulosus. Aug. flor. Cnghm. P. 203. Tab. 444, fig. 5.

*Trifolium maritimum*. Planta est trifolia, flore papilionaceo, siliculis lenticularibus caudatis, confertim nascentibus, unum semen lentis figura continentibus. Ins. *Tow whey san*. Oct. 20. 1702. Cnghm. P. 205. Tab. 446, fig. 8.

*Trifolium monocarpon* Meliloti affine, folliculis parvis compressis. *Cheusan*. P. 205. Tab. 446, fig. 1.

*Verbasci similis* quadrato caule, *Cheusan*. minore folio acuminato, subtus molli tomento candicante. P. 207. Tab. 448, fig. 2.

*Veronica cheusan.*, Grossulariae folio, flore amplo purpureo. Alyso montano Dioscor. Fabio columno proxime accedit. P. 208.

*Viburnum cheusan*. Frutex baccifer, foliis Ulmi subrotundis, ad summitatem latioribus, in acumen brevius desinentibus, serratis, et inferne parum incanis, ex adverso binis, Bacca rubra, rotunda, acida, adstringente, semine unico, subrotundo, duro et compresso, racematim congesta. Oct. matur. Cnghm. P. 208.

*Viola parva cheusan*, grumosa radice. P. 208.

*Virgo aurea* minor, spicato flore luteo. *Chusan*. P. 209.

*Visci similis* frutex *cheusan*. Clematidis. P. 210. Tab. 448, fig. 3.

*Vitex Sinarum*, subrotundis argenteis foliis bijugis, caule quadrangulare. Ins. *Crocodil*. P. 210. Tab. 449, fig. 1.

*Vitis Idaea* seu *Vaccinia chusanensis*. Frutex est flore rufescente, campaniformi, urceolato, globoso (inter Ericae.) ad os parum diviso. Ex calyce 5 fido surgit pistillum, quod deinde abit in baccam nigro-purpuream edulem. Foliis pruni serratis subrotundis, acuminatis. Nov. flor. Cnghm. P. 210.

Comp. above Mus. Petiv. 987, Gazoph. tab. 35, fig. 7.

*Vitis vinifera sylvestris*. *Cheusan*. P. 211.

*Vitis vulpina* dicta Virginiana alba. Almag. 392. Hujus ramulum Cnghm. ex ins. *Chusan* ad nos transmisit. Et circa Constantinopolin frequens est (Dr. Timone.)

*Vitis agrestis sinica* minor "The least Fox grape." *Chusan*.

*Vitis vulpina*. L. has been observed also in Manchuria and Japan. One of the above mentioned grapes may be *V. labrusca*, which has been observed in Formosa, Amoy, Peking.

*Ulmus nana cheusan*. Frutex fructu ovato, plano, membranaceo, ad sumitatem parum diviso, semine foeto unico, lenti-formi, in fructus centro, foliis Ulmi fere splendentibus, glabris, serratis et acuminate. Fructus prodit ex flore, vel calyce 5 fido et Nov. maturescit. Sin: *Kin tchang lang*. Cnghm. P. 211.

*Urtica racemifera* maxima Sinarum, foliis subtus argentea lanugine villosis. Planta sylvestris *Ma* dicta, unde efficitur filum instar Lini *ma sien* dictum. Cnghm. P. 212. Tab. 429, fig. 2.

*Boehmeria nivea*. Hook. and Arn.

Planta sativa *Co* dicta, unde efficitur *Co-pou* pro vestibus aestivis. Cnghm. P. 212.

*Pueraria*. See above Le Comte 10.

*Xanthium* seu *Lappa* minor *Chenopodii* foliis. Cheusan. P. 213.

*Xeranthemum sesamoides* flore albo, *Ericae* foliis cauli tomentoso adstrictis, ad radicem vero *Stachadis citrinae* longioribus, et solutis. Ins. *Crocodil*. P. 213. Tab. 449, fig. 5.

This plant is identified in Lam. Enc. Bot. III. 239 with *Xeranthemum heterophyllum* from the Cape of G. H.

*Arbusculum bacciferum* *Canellae* folio trinervi, subtus argentea lanugine villosa. Cheusan. Cnghm. P. 213. Tab. 450. fig. 2.

*Arundo sinica* ramosa, plurimis squamulis ad culmum donata. P. 213.

*Calamintha montana sinica*, *Betonicae* folio, floribus coerulescentibus P. 213. Tab. 450, fig. 8.

*Eupatorium cheusanense*, *Urticae* foliis, pediculis alatis et auriculatis, floribus summo caule conglomeratis. P. 213. Tab. 451. fig. 2.

*Frutex cheusan*. foliis rugosis, *Jasmini* flore tetrapetaloide. P. 213. Tab. 451, fig. 1.

*Frutex sinensis* alatis foliis, siliquis torosis, villis aureis densius obductis. Tab. 451, fig. 8.

*Frutex sinensis*, *Senae* sylvestris folio angustiore, nodosa siliqua rostro longiore donata. Tab. 451, fig. 10.

*Gramen parvum cheusan*. spicatum, granulis compressis cordiformibus. Tab. 452, fig. 6.

*Gramen cheusan*. foliis brevibus aculeatis globiferum, globulos aureos *Chamaemeli* nudi similes, inter folia proferens. Tab. 451, fig. 9.

*Mespilus oxycantha cheusan.* oblongis, mucronatis et serratis foliis, fructu longiore, summis ramulis innascente. P. 216. Tab. 453, fig. 3.

Loureiro Fl. coch. 392 identifies this with his *Mespilus pyracantha* (see below.)

*Muscus denticulatus minor.* Cheusan. Tab. 453. 9.

*Lycopodium?*

### III. SWEDISH COLLECTORS OF PLANTS IN SOUTH-CHINA, 1751 AND 1766.

The greater part of the accounts presented in this chapter have been borrowed from a book, which bears the following title:

A VOYAGE TO CHINA AND THE EAST INDIES BY PETER OSBECK

together with

A VOYAGE TO SURATTE BY OLOF TOREEN

and

AN ACCOUNT OF THE CHINESE HUSBANDRY BY CAPTAIN CH. ECKEBERG.

translated from the German by

JOHN REINHOLD FORSTER.\*

to which are added

A FAUNULA AND FLORA SINENSIS.

London 1771. Two volumes.

**PETER OSBECK**, a Swede and a pupil of the great Linnaeus, to whom the latter was indebted for the greater part of the Chinese plants and animals he has described—was born in 1723. In 1750 he set out on a journey to China, as chaplain to a Swedish East Indiaman, the *Prince Charles*, which left Gothenburgh 18 Nov. 1750, and arrived at Cadiz 4 January 1751. After a stay of 10 weeks they left this place 20 March, sailed around the Cape, without landing there, in the second half of May. June 12 they passed St. Paul, on July 15 anchored in the harbour of Angeri (Java, Sundastr.), left again on the 17th. Here Osbeck was able to collect some plants. On the 25 Aug. 1751 the *Prince Charles* anchored at Whampoa (near Canton) and remained there more than four months, weighing anchor on the 5th Jan. 1752. On the way home Osbeck again collected Javanese plants and beasts in New Bay, where the *Pr. Charles* stopped a few days. In April O. made some collections on the island of Ascension and on the 26. June 1752 came back to Gothenburgh.

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\* The well known naturalist and traveller, who accompanied Capt. Cook on his second circumnavigation of the globe 1772-75.



Osbeck was a zealous naturalist and brought home a rich collection of natural objects, chiefly Chinese specimens, for during his long stay at Whampoa and Canton he had ample opportunity of visiting the neighborhood of these places. All his collections he placed in the hands of Linnaeus, who described them, the plants in his *Species plantarum*, published a year after Osbeck's return.

Osbeck's original account of his voyage appeared in 1757 in his native language: *Dagbok öfver en ostindisk resa*. He published also some botanical articles in the *Act. acad. Holm.* 1762, 1765, and 1769. He was member of the Academy of Stockholm and of the Soc. of Upsal, and died as Rector of Hasloff and Woxtorp in 1805.

A German translation of Osbeck's narrative was made in 1765 by *J. G. Georgi*, and revised and completed by Osbeck himself. *Georgi*\* was Professor of Mineralogy at the Academy of St. Petersburg. He accompanied Pallas on his travels to Siberia and died 1802.

The English translation of Osbeck's book was made from the German by *J. R. Forster*, the well known companion in travel of Capt. Cook.

All the Chinese specimens gathered by Osbeck belong to the neighborhood of Canton. During his stay at Whampoa he repeatedly made excursions to Canton and investigated the Flora of the islands in the river. He often mentions *Danes* island, *French* island, only separated from the latter by a stream, and *Honam* (erroneously written *Stonam* in the narrative), an island west of the two first mentioned and on which a large suburb of Canton is situated. Not many of the botanists in Europe will be aware, I think, that *Danes* island on which Osbeck collected plants 130 years ago, has been for nearly 20 years the residence of one of the most distinguished botanists of our time, who has done so much to throw light on the Flora of China and whose name has a world-wide reputation. The numerous papers on botanical matters which have been published by Dr. *H. F. Hance* are generally dated from the British Consulate at Whampoa, which has been established on *Danes* island and not, as might be presumed, at the Chinese city of Whampoa, situated opposite the Consulate on the left bank of the river.

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\* Willdenow named the genus *Georgina* (*Dahlia*) after him. Thus this favored gardenflower was not, as is erroneously believed by some authors, dedicated to King George III of England.

Osbeck's notes on his plants collected near Canton are found scattered in his diary. He enumerates in the whole 244 Chinese plants, giving their Linnaean names, often describing them. Sometimes he adds also the Chinese names according to the Canton dialect, but generally he sadly perverts the Chinese sounds. He says himself (II. 10) that it is possible that the Chinese, who gave him these names, have imposed upon him on many occasions.

Linnaeus, when determining Osbeck's Chinese collection seems to have been under the impression, that the habitats marked on the herbarium tickets, as Danes island, French island etc, referred to places of India, for in his *Species plantarum*, published 4 years before Osbeck's narrative appeared, all plants gathered by the latter, figure, with a few exceptions, as Indian plants only. But as we have seen O. never visited India. He collected a few plants on the coast of Java, but the bulk of his collection was represented by Chinese specimens. I may quote a few instances. In Linnaeus' *Spec. plant.* it is clearly stated, that Osbeck had gathered *Rubus parvifolius*, *Cyperus Iria*, *Barleria cristata* in India, whilst Osbeck had brought these plants from Canton. It seems that Linnaeus had a very confused idea with respect to the position of China and we cannot but think, that he considered the latter name to be a synonym for India. He describes many plants not known from elsewhere than from China as natives of India. Thus he states himself, that his *Rosa indica* and *Lagerstroemia indica* are Chinese plants. He describes his *Daphne indica* from specimens gathered by Osbeck at Canton, and this plant has, as far as I can conclude from the quotations in D. C. Prodr. XIV. 543, never been observed in India. On the other hand *Sphaeranthus chinensis* in his *Spec. plant.* figures as an Indian plant only. Compare D. C. Prodr. V. 371 "cur chinensis cum ipse auctor ex India ortam dicat?" It is strange to say that none of the botanists who after Linnaeus have compiled general systematic works on Botany, as Lamarck, Willdenow, Sprengel, De Candolle, Kunth etc., ever ventured to refer, with respect to Chinese plants directly to Osbeck's book. They draw from Linnaeus and mention Osbeck's Canton plants only in such cases for China, when the former had happened not to give India as habitat. But, as we shall see further on, by far the greatest part of the plants Linnaeus knew from China were collected by Osbeck near Canton.

A considerable number of Osbeck's Chinese specimens were known previously from India (Rumphius, Rheede), but were

then new for China and of many of them Linn. had hardly seen original specimens from India. There are in his collection about 50 (probably more) entirely new plants, 12 of which are represented by drawings in his book, viz:

- |   |   |
|---|---|
| Tab. 1 <i>Baeckia frutescens</i> .        | Tab. 6 <i>Trichomanes chinensis</i> .   |
| Tab. 2 <i>Osbeckia chinensis</i> .        | Tab. 7 <i>Rhamnus lineatus</i> .        |
| Tab. 3 fig. 1 <i>Pteris semipinnata</i> . | Tab. 8 <i>Barleria cristata</i> .       |
| fig. 2 <i>Utricularia bifida</i> .        | Tab. 9 <i>Gerardia glutinosa</i> .      |
| Tab. 4 <i>Pteris vittata</i> .            | Tab. 10 <i>Carpesium abrotanoides</i> . |
| Tab. 5 <i>Helicteres angustifolia</i> .   | Tab. 11 <i>Clerodendron fortunei</i> .  |

Besides dried specimens of plants Osbeck had brought also from China many seeds from which Linnaeus succeeded in raising several new plants. It does not seem, that he had examined the whole of Osbeck's collection, for we meet in Osbeck's narrative some names and descriptions of Chinese plants not found in the Spec. Plant.

LIST OF CHINESE PLANTS KNOWN TO LINNAEUS.

Forster in compiling his *Flora sinensis*, or Catalogue of Chinese plants (see above.) enumerates all Osbeck's specimens from China (244) and adds the names of 56 more Chinese plants known in 1771. In the following list I venture to present a more complete list of Linnaean Chinese plants (for Forster has overlooked many species) arranged according to Bentham and Hooker's *Genera Plantarum*. I always give their new names in the system, should the Linnaean name have been changed. The plants collected by Osbeck I mark with *Osb.* As in his narrative (Engl. transl.) the accounts of Chinese plants are found in the first volume from p. 208 to the end, and in the second from p. 1 to 17, I shall quote only the pages not the volumes.\*

DICOTYLEDONS.

1. ***Clematis chinensis***, resembling *Cl. vitalba*. Danes isl. Canton. *Osb.* 329. 393.

\* Abbreviations of the titles of some botanical works, to which I shall have to refer frequently in the subsequent pages:

G. P.=Bentham and Hooker, *Genera Plantarum*.

D. C.=De Candolle's *Prodromus Syst. nat. veg.*

Kth.=Kunth's *Enumeratio Plantarum*.

Lour.=Loureiro's *Flora cochinchinensis* 1793 (edit. Willdenow.)

Fl. hbk.=Bentham's *Flora hongkongensis* 1861.

Add. Fl. hbk.=Dr. Hance's Supplement to the *Flora hongk. Journ. Linnaean Soc.* XIII.

This name was given by Osbeck and is not found in Lin. Sp. pl. Retz described the plant under the same name in his Obs. bot (1780). D. C. I. 3. According to Maxim. Dec. XX probably the same as *Cl. terniflora*. D. C.

2. ***Illicium anisatum***. Lin (Forster.)

Star Anis was first brought to Europe from the Phillipines in 1588. Linnaeus had hardly seen a specimen of the Chinese plant producing Star Anis.

3. *Lan fa* or *Leen fa* Chinensium. Canton. Osb. 209.—*Gnao* or *Iaen gao* (*Nymphaea Nelumbo* L.) white roots of the thickness of carrots, but longer, articulated and hollow inside. Poor people eat them raw, but they are not very palatable. Osb. 310.

***Nelumbium speciosum***. Willd. Sin: 蓮花 *lin fa*, the roots 蓮藕 *lin ngau*.\*

4. *Fumaria spectabilis*. Lin. (Amoen. acad II. (1751) and VII. (1768; drawing) described as a Siberian plant, but Gmelin, from whom Linnaeus draws, states clearly that the plant had been received from China. This is ***Dicentra spectabilis***. Miq. It grows wild in the Peking mountains.

5. Chinese Cabbage (***Brassica chinensis***. L.), does not form heads. In Chinese *kay lan*. Another sort called *pack-soa* with bulbous root is sold here (Canton) likewise. Osb. 313.

The Chinese names intended are probably 芥藍 *kai lan* and 白菰 *pak sung*. Linnaeus states, that his plants had been raised from seeds brought by Osbeck.

6. ***Brassica violacea***. Lin. This plant, which Linnaeus describes as a Chinese plant, is only known, it seems, from his specimens.

7. Oriental Mustard (***Sinapis orientalis***. Lin.) Osb. 309.

Known to Tournefort from the Levant. Linnaeus does not mention it for China.

8. ***Sinapis chinensis***. Lin. This plant was first noticed by Boerhave, who in 1710 received the seeds from Batavia. D. C. I. 219, and Lour. 485, mean that it is rather a variety of the next.

9. ***Sinapis juncea***. Lin. Asia, China (Lin.) Cultivated in Europe since 1710.

10. ***Sinapis brassicata***. Lin. China. According to Lour. 485 also a variety of *S. juncea*.

11. *Raphanus sativus*. Lin. var *oleifera*. D. C. I. 228. ***R. chinensis*** annuus ***oleiferus***. Lin. Seeds of this had been brought from China by Capt. Eckeberg (s. further on.)

\* As Osbeck gives (or tries to give) the Chinese names in the Canton dialect I shall write the Chinese sounds according to the same dialect.



12. **Polygala chinensis**. Lin. I am not aware whether this species is really found in China. Lin. gives only India as habitat.

13. *Polygala ciliata*. L. Danes isl. French isl. Osb. 356, 393. Known from Ceylon before. *Salomonina? ciliata*. D. C. I. 334.

14. **Dianthus chinensis**. Lin. Introduced into Europe from China about 1702.

15. **Hypericum chinense**. L. Danes isl. Osb. 2.

Hance. Journ. bot. 1879. 8. Canton prov. *H. monogynum*. L. is the same.

16. On p. 246 and 39 Osb. gives some accounts of the **Tea** shrub. When the ship departed from Whampoa Osbeck's Tea shrub, which stood in a pot fell upon the deck during the fring of the canons and was thrown over board.

17. **Camellia japonica**. L. sin : *fo kai*. Osb. 17.

Known previously in Europe.

18. **Vatica chinensis**. Lin. Mant 242. Smith icon. ined. Linn. I 36, tab. 36. Benth. Hook. G. P. I 192 however state, that this is not a Chinese but an Indian plant.

19. **Althaea rosea**. Cav. According to the Bot. mag. 3198 introduced from China 1753. Bat Linn. (*Alcea rosea*) says only : in Oriente. The plant is very common in China.

20. **Malva verticillata**. L. *Malva sinensis erecta floribus albis minimis*. Boerhave Lugd. (1720). Cultivated in England as early as 1683. *M. chinensis* Mill. Dict. 5 is probably the same.

21. **Sida spinosa**. L. Canton. Osb. 329.

Known previously from India.

22. **Urena chinensis**, caule erecto, floribus majusculis. French isl. Osb. 363.

This name is not found in botanical works.

23. **Urena lobata**. L. French isl. Osb. 354.

Known from China before. *Urena sinica*, Dillenius. 1732.

24. **Urena procumbens**. L. a little tree, near Canton. Osb. 387.

25. **Hibiscus mutabilis**. L. Whampoa. Osb. 198.

Known from China before. *Ketmia sinensis*. Tournef.

26. **Hibiscus ficulneus**. L. Canton. Osb. 328.

Known from Ceylon before.

27. **Gossypium herbaceum**. L. French isl. cultum. Osb. 349.

28. **Sterculia platanifolia**. Cav. introduced from China in 1757, known to Lin. under the name of *Hibiscus simplex*., Plukenet's *Tetraglottis*.

29. **Helioteres angustifolia**. L. sin: *Kay ma*. Danes isl. Osb. 376.

30. **Waltheria indica**. L. Danes isl. Osb. 375.

Known from Ceylon before. Fl. hgk. 38.

31. **Bartramia indica**, Danes isl. sin: *hoang fa mo*. Osb. 376.

*B. indica* not mentioned in any system. botan. work. *Bartramia* is now considered a section of **Triumfetta**. Sparrmann (s. further on) gathered at Canton *Triumfetta Bartramia*, which is probably the same. D.C. I 508 dubious plant. The Chinese name given by Osb. is probably 黃花罌 *wong fa mo*, which is applied in Canton to *Sida rhombifolia*. L. (Parker)

32. **Oxalis corniculata**. L. sin: *Syn mee*. Danes isl. Osb. 389.

The Chinese name of this plant is 酸味 *sün mi* (Parker.) It was known from India before Osbeck.

33. **Averrhoa Bilimbi**. L. An oblong, yellow, sourish fruit with 5 deep furrows, which has the quality of Lemons, but is sooner spoiled. The Chinese at Canton call it *samm-nim* and make a conserve of it called *ka la mang* Osb. 306.

A. Bilimbi, known from India before, sin: 三捻 *sam nim*.

34. **Impatiens Balsamine**. L. Canton. Osb. 209.

Known from India before.

35. **Impatiens chinensis**. L. Canton, Osb. 344.

36. **Paullinia asiatica**. L. with sharp pointed hamated thorns. It makes good hedges. Danes isl. Osb. 9.

Known from India before. D.C. II, 83 **Toddalia aculeata**. Pers Fl. hgk. 59.

37. There are in Canton 2 sorts of *China Oranges* (*Citrus sinensis*. L.) The first is that called the *Mandarin Orange*, whose peel is quite loose, and the Chinese call them *kamm*. It is the best kind. The peel of the other sort sits close. It is called *tiang* or rather *kang*. Osb. 307.

The Mandarin Orange, *Citrus nobilis*. Lour. is termed 柑 *Kan* in Canton, the Coolie Orange (see above Martini 8) is known in China under the name of 橙 *ch'eng*

38. A sort of low sweet Orange trees, with a small fruit called *gatt*. Canton, Osb. 208.

橘 *Kwat* is a generic term for Oranges.

39. *Kamm-kat* is the name of a sort of small Lemons, which are not much larger than Cherries. Canton. Osb. 306.

**Citrus japonica**. Thbg. sin: 金橘 *Kam Kuat*.

40. **Buxoides aculeata**. It is like our Boxtree but thorny. Danes isl. In Chinese *sow pann ghip*. Osb. 394.

Perhaps **Atalanta buxifolia**. Oliv. Fl. hgk. 51.

41. Here are also two sorts of Lemons (**Citrus decumana**. L.) which are called *Yao* by the Chinese. The first is round and its name is *Lo yao*. The second called *Han yao* is long and is usually offered as a sacrifice to their idols. Osb. 307.

The Chinese name for *Citrus decumana* is 柚 *Yau*.

42. The *Lemt yes* tree (*Citrus medica*. L.) in Canton bears little round sour Lemons called *na mang*, and which are used instead of Tamarinds, or common Lemons, generally before they are ripe. The trees are sold in pots and seldom about a yard high. Osb. 208. 306.

This is I believe *Citrus medica*. L. var. *acida*. Hook flor. Ind. I 514. Sin: 檸檬 *ning meng*.

43. **Ailanthus glandulosa**. Desf. (1786.) This Chinese tree has been introduced into Europe in 1751 and was at the time of Linnaeus known under the name of *Vernis du Japon*.

44. *Chinese Olives* in Canton, *pack-la*. Osb. 309.

Osbeck evidently means *Canarium album*. Raensch. sin: 白欖 *pak lam*.

45. *Olom sio*, a certain great tree with pinnated leaves, smooth, with opposite folioles. A resin comes out of the tree much like the Gum arabic. Danes isl. Osb. 9

*Canarium Pimela*. Koenig. sin 烏欖樹 *u lam shü*.

46. **Salacia chinensis**. L. See D. C. I. 571.

47. *Rhamnus oenopolia*. L. in Chinese *Kog-ne-im*. Near Canton. Osb. 386.

Known from India before. *Zizyphus oenoplia*. D.C. II. 21.

48. *Rhamnus lineatus*. L. French island. Osb. 353.

See above Plak. Amalth. Frutex sin. Majorani fol. *Berchemia lineata*. D. C. II. 23. Fl. hgk. 67.

49. *Rhamnus Thea*. L. Poor man's tea. The leaves of this shrub are made use of by the poor Chinese instead of tea. They call it *tia*. Danes isl. Osb. 375.

*Sageretia theesans*. Brong.—Fl. hgk. 68.

50. **Koelreuteria paniculata**. Laxm. *Sapindus chinensis*. L. fl. Introduced into England 1763, described 1772 by Laxmann.

51. *Lat-ye* is the Chinese name of a fruit, which is eaten in Canton with tea. It tastes almost like a plum, and looks like large gallapples, covered with a brownish, thin, and warty skin. *Long-an* is less than *lat-ye*. They have a smooth skin and sweet pulp. Osb. 308.

*Nephelium Litchi* Camb. and *N. longan*. Camb.

52. **Rhus chinense.** Osb. Danes island, in Chin: *monkhi*. Osb. 375.

Probably the same as *Rh. chinense* Mill. Dict. known before Osbeck from China. See above Pluk. Amalth. *Rhus quinquefol. sin.*

53. *Rhus javanicum.* L. germine rubro, Danes island. In Chin: *tuy sha*. Osb. 375.

D. C. II. 67. **Rhus semialata.** Murr. var. **Osbeckii.**

54. *Mango* (**Mangifera indica.** L.) This fruit is sold in China by the name of *quai mao*. In the Javan. language it is called *Po*.

I am not aware what name is intended by *quai mao*. The Chinese call the fruit *mango* as the Malays do. Fl. hgk. 70.

55. **Crotalaria juncea.** L. Canton. Osb. 336.

Known from India before.

56. **Crotalaria chinensis** Lin. China. D. C. II. 130.

57. **Crotalaria sessiflora.** Lin. China.—Fl. hgk. 74.

58. **Indigofera tinctoria.** L. French isl. In Chin. *tong am* or *va*. Osb. 350.

Known from India before.

59. **Astragalus chinensis.** Lin. fl. China. D. C. II. 294.

According to Lam. Enc. Bot. I. 310 cultiv. in Paris.

60. **Astragalus sinicus.** Lin. China.

D. C. II. 282. *Astr. lotoides.*

61. *Phaca trifoliata.* Lin. China. A dubious plant. D. C. II. 275. G. P. I. 507. **Crotalaria** or **Astragalus.**

62. **Arachis hypogaea** L. Danes island, cultiv. In Chinese: *fy shin*. Osb. 377.

Known before from Asia and America. Sin: 花生 *fa shang*.

63. *Hedysarum triquetrum.* L. Danes isl.—In Chin: *Ka song* so. Osb. 374.

Known from Ceylon before. D. C. II. 326. **Desmodium triquetrum.**

64. *Hedysarum gangeticum.* L. Canton. Osb. 330.

Known from Ceylon before. D. C. II. 327. **Desmodium gangeticum.**

65. *Hedysarum maculatum.* L. Danes isl. Osb. 8.

Known from India before. D. C. II. 327. **Desmodium maculatum.**

66. *Hedysarum triflorum.* L. Danes and French isl. Osb. 353. 392.

Known from Ceylon before. D. C. II. 334. **Desmodium triflorum.**

67. *Hedysarum heterocarpum.* L. French isl. Osb. 354.

Known from Ceylon before. D. C. II. 337. **Desmodium heterocarpum.**

68. *Hedysarum biarticulatum.* L. French isl. Osb. 378.



Known from Ceylon before. D. C. II. 339. *Desmodium biarticulatum*.

69. *Hedysarum pulchellum*. L. Danes island. Osb. 374.

Known from Ceylon before. D. C. II. 339. *Desmodium pulchellum*.

70. *Hedysarum lagopodioides*. L. Canton. Osb. 346.

D.C. II. 324. *Uraria lagopoides*.

71. *Hedysarum styracifolium*. L. Danes island. Osb. 8.

D.C. II. 352. *Alysicarpus styracifolius*.

72. ***Abrus precatorius***. L. A sort of little red pease with a black spot. They are valued as the lowest coin and used in weighing gold. Osb. 384.

Known from India before.

73. *Uang teo*, a sort of small pease of which cheese is said to be made. Canton. Osb. 305.

*Glycine* (*Soja*) *hispida*. Moench. The Soja bean, sin: 黃豆 *wong tau* of which Bean curd is made. First known from Japan (Kaempfer).

74 *Lack tao* is the Chinese name of a sort of pease, which are much less than our wild vetches. Osb. 304.

*Phaseolus radiatus*. L. sin: 綠豆 *luk tau*. First known from Ceylon.

75. ***Dolichos sinensis***. L. Callvanses. A dish which is like our sweet cheese and which they call *Fdou fu* is prepared of this. Osb. 218. 304.

The name of *D. sinensis* is first met in Rumphius' Amb. V. 375. Chinese Bean curd 豆腐 *tau fu* is made of different kind of beans.

76. *Dolichos scandens maximus*, with large black beans which were said to be poisonous. The pods likewise grow black, when the fruit ripens. The Chinese call it *syoe lock tao*. Osb. 394. But p. 375 Osb. gives the Chinese name of the same plant, which he observed on Danes island as *min tao*.

By the first name is probably intended 小綠豆 *siu luk tau*. According to Lour. 539 *min teu* is a variety of *Dolichos Catjang*. L. Parker gives 麵豆 *min tau* as the Cantonese name of *Cajanus indicus*. Spr. Comp. also Fl. hgk. 88 with respect to the poisonous seeds of *Canavalia virosa*.

77. ***Cassia sophera***. L. Canton. Osb. 330.

Known from Ceylon before.

78. *Cassia procumbens*. L. Canton Osb. 336.

D.C. II. 504. *Cassia pumila*. Lam. E. Bot. I. 651. China. India.

79. ***Tamarindus indica***. L. Canton. Osb. 309.

Known from India before. Lour. 488 mentions the Tamarind as growing in Cochinechina, not in China.

80. *Mimosa chinensis*, inermis, stipulis foliolo longe majoribus, semicordatis. French isl. Osb. 80.

Perhaps *Acacia concinna* Fl. hgk. 101.

81. **Rubus parvifolius**. L. Canton. Osb. 11.

D.C. II. 564. identifies this sp. with *R. moluccus*. Rumph. but Bth. Fl. hgk. 105. seems to exclude this synonym.

82. **Rosa indica** L. Whampoa. Osb. 198.

83. *Mo quai fa*. Canton. Osb. 209.

玫瑰花 *mei kui fa* is the Chinese name of a Rose; according to Lour. 395. *R. cinnamomea*. L.

84. **Saxifraga sarmentosa**. Lin. fil. (1781.)

This plant, a native of China, was introduced into our gardens about the middle of the last cent. Bot. mag. 92.

85. **Baeckea frutescens**. L. Danes isl. In Chin: *tiong ma*. Osb. 373.

This name *Tiongine* applied to this plant by Poiret (Lam. Enc. Bot. VII. 681.) seems to be derived from this (evidently wrong) Chin. name. Fl. hong. 118.

86. **Psidium Guajava**. L. eaten in Canton. Osb. 309.

As is known, this tree, generally cultivated in tropical countries, is a native of trop. America.

87. **Osbeckia chinensis**. L. Canton. Osb. 342. On the drawing of this plant, Tab. 2. Osbeck gives the Chinese name of it in Chinese characters, 金香蘆 *komm heong loaa* (feather of goldroses. Osb).

According to Parker the Chinese name of it in Canton sounds 鐵 | | *tip heong lo*.

88. **Melastoma octandra**. L. Canton. In Chin: *te limm*. Osb. 341.

Known from Ceylon before. D. C. III. 142. **Osbeckia octandra**. Not mentioned for China by other authors. According to Parker 地拈 *tei nim* is the Canton name for *Mel. repens*. Desc.

89. **Melastoma malabarica**, with fine red flowers. French isl. Osb. 354.

*M. malabathricum*. L. Known from India before.

90. **Ammania baccifera**. L. Near Canton. Osb. 387.

D. C. III. 78, 79. Linnaeus' *A. baccif.* seems to be a dubious plant; perhaps. *A. vesicatoria*. Roxb. (India).

91. *Lythrum fruticosum*. Lin. known to Linnaeus from China. Also in India. D. C. III. 92. **Grislea tomentosa**. Roxb. Not mentioned for China by later authors.

92. **Lawsonia inermis**. L. French isl. Osb. 354.

Known from India and W. Asia before.

93. **Lagerstroemia indica**. Lin. known to Linnaeus as a native of China, mentioned earlier by Rumphius and Cleyer (Japan).

94. **Punica Granatum.** L. Whampoa (cult.) Osb. 198.

This tree, a native of N. Africa and W. Asia, is cultivated in China.

95. **Jussiaea repens.** L. Honam. Osb. 17.

Known from Ceylon before.

96. *Trapa natans* L. in Chin: *ling kamm* or *leng ka*. Osb. 305.

Linn. fil. described the Chinese sp. as a new plant *Tr. bicornis*. The spec. cult. at Peking under the name of 菱角 *ling kio* (ling kok, Canton.) is *Trapa bispinosa* Roxbg.

97. **Trichosanthes anguinea.** Linn. Hort. Cliff. This plant was known as a Chinese plant before Linn.—Rumph. amb. V. 407,—*Cucurbita sinensis* fructu longo etc. Tilli Cat. pl. h. Pisani I. t. 71. (1723).

98. **Cucurbita lagenaria.** L. in Chin: *po-o* Canton. Osb. 272.

Cultivated throughout China. The Chinese sounds intended by Osbeck are probably 瓠瓠 *po u*.

99. *Cucumis acutangulus.* Lin. China. India. D. C. III. 302.

**Luffa acutangula.** Ser.

100. **Cucurbita chinensis,** grows spontaneously on French isl. Osb. 362.

This name is not found in system. botan. works.

101. *Gourds, Melons, and Water melons,* which are red on the inside. Canton. Osb. 309.

102. **Bryonia cordifolia.** L. Danes isl. Osb. 374.

Known from Ceylon before.

103. *Molugo pentaphylla.* L. Near Canton. Osb. 387.

Known from Ceylon before. Flora hgk. 23, where the plant is mentioned as a variety of *M. stricta*. L.

104. **Hydrocotyle asiatica.** L. ? Danes isl. Osb. 7.

Known from Ceylon before.—Fl. hgk. 134.

105. **Celery** cultivated at Canton. Osb. 313.

*Apium graveolens.* L. is cultivated throughout China.

106. **Sium ninsi.** Linnaeus describes it as a Chinese plant but I am not aware that any botanist after Linn. has mentioned it for China. But the plant may be found there as it is frequently seen in Japan.

**Sium sisarum.** Linnaeus supposes this plant also to be a native of China, but Maximowicz. (Dec. XIII.) has proved that it is a Persian plant, which has never been gathered in China.

107. *Hydrocotyle chinensis.* Linnaeus, China. Sprengel Syst. I. 878. identifies it with **Crantzia lineata.** Nutt. an American plant. But D. C. IV. 71. considers it a dubious plant.

108. *Athamantia chinensis*. Lin. This is **Cnidium Monnieri**. Cass or *Selinum Monnieri*. L. D. C. IV. 152. Europa, Asia.

109. **Aralia chinensis**. L. a tree about 2 yards high covered with thorns. Leaves decomposite. French isl. Osb. 378.

110. **Panax quinquefolia**. L. *Ginseng*, in Chin. *yan sam* Osb. 222.

Osbeck of course does not mention it as a plant of South-China.

111. *Zanthoxylon trifoliatum*. L. a tree not observed before. French isl. In Chin: *lack fa*. Osb. 364. 394.

This is *Panax aculeatus*. Ait. or **Acanthopanax aculeata**. Benth. Hook. G. P. 939. According to Dr. Hance common in South-China.

112. **Sambucus nigra**. L. Danes isl. Osb. 8.

*S. nigra* is hardly found in China. The *S. nigra* of Lour. 226. is a different species. D. C. IV. 323.—According to Dr. Hance *S. chinensis* Lindl. is a common spec. near Canton.

113. **Nauclea orientalis**. L., in Chin: *moy fa*. Danes and French isl. Osb. 355. 395.

Known from Ceylon before. After Osbeck not gathered in China.

114. *Hedyotis herbacea*. L. ? Danes isl. Osb. 4.

Known from Ceylon before. Fl. hkg. 151. **Oldenlandia Heyniana**.

115. **Oldenlandia umbellata**. L. Near Canton Osb. 386.

Known from Ceylon before. Not observed in China after Osb.

116. **Mussaenda frondosa**. L., in Chin: *kau li mang*. French isl. Osb. 363. The characteristic white calycine leaf is not mentioned in Osbeck's description.

Known from Ceylon and E. India before. Flora hongk. 153.

117. **Gardenia florida**. Lin. See Pluken. Amalth. p. 29, *um ki*. Flora hkg. 153.

118. *Ixora coccinea*. L. in Chin: *kan long fa* or Emperor's flower. French isl. Osb. 354.

According to D.C. IV. 486. Osbeck's plant is *I. stricta*. Roxb. By Osbeck's Chinese name is probably to be understood "Flower of the Emperor Kien lung."

119. **Morinda umbellata**. L. ? in Chin: *pa kock fa*. French isl. Osb. 363.

Known from Ceylon before. Flora hkg. 159.

120. **Spermacoce verticillata**. L. (description) French isl. Osb. 355.

According to D. C. IV. 541, this is an American plant.

121. **Rubia cordifolia**. Linnaeus describes it as a Chinese and Siberian plant. It is very common in North-China but I do not find it mentioned for South-China.



122. **Eupatorium chinense**. Lin. See. D. C. V. 179. Not observed in China by other collectors since Linn.

123. **Solidago chinensis** (a name given by Osb. not Linn.) Danes island. Osb. 393.

*Solidago virgo aurea*. L. is found in Hongkong. D. C. V. 342. states *Solidago chinensis* Spreng. = *Senecio vagans*. But Sprengel does not describe a plant of that name.

124. *Aster indicus*. L. French isl. Osb. 378.

This is **Boltonia indica**. Bth. Fl. hgk. 174.

125. *Aster chinensis*. Linn. described it first in the Hrt. Cliff. (1737) but it was previously known in Europe. D. C. V. 274.

**Callistephus chinensis**. Nees. Much cultivated in Peking.

126. *Conyza chinensis*. L. Near Canton. Osb. 386.

D. C. V. 445. **Blumea chinensis**.

127. *Conyza hirsuta* L. In Chin: *ky lat soy*, also *kang gan fa*. Danes isl. Osb. 374. 394.

D. C. V. 453. **Pluchea hirsuta**. Less.

128. *Baccharis indica*. L. In Chin: *ka te gnai*. Danes isl. Osb. 394.

Known from Ceylon before. D. C. V. 451. **Pluchea indica**. Less. Flor. hgk. 179.

129. **Sphaeranthus chinensis**. Linn. Mant. 119. But he gives only India as habitat. It seems the plant has not been observed after Linn.

130. **Carpesium abrotanoides**. L. Canton, Honam, Osb. 329, 17.

Has been observed also in Formosa, India.

131. *Verbesina chinensis*. L. In Chin: *ka ling fa*. Danes isl. Osb. 393.

Fl. hgk. 180. **Anisopappus chinensis**. Hook. Arn.

132. *Xanthium orientale*. Linn. China. It is identical with *X. indicum* Roxb. and **X. strumarium**. L.—Fl. hgk. 181.

133. **Siegesbeckia orientalis**. L. In Chin: *chi mag*. Danes isl. Osb. 374.

Described by Linnaeus in 1737, but Plukenet described it previously in the Amalth. 58.

134. *Verbesina prostrata*. L. French isl. Osb. 356.

Known from India before. D.C. V. 490 **Eclipta prostrata** L.

135. *Verbesina calendulacea*. L. French isl. Osb. 356.

Known from Ceylon before. D.C. V. 539 **Wedelia calendulacea**. Less.

136. **Chrysanthemum indicum**. L. In Chin: *cock fa*. On the walls of Canton, also in pots. Osb. 6.

The Chin. name 菊花 *kok fa*. *Matricaria sinensis*. Rumph. Amb.

137. **Chrysanthemum indicum**. L. cultivated in gardens, Canton. Flowers as large as those of *Tagetes patula*, white, double or full like a round brush. Osb. 15.

138. *Artemisia minima* Linn. Chin. D.C. VI. 140 and G. P. II. 430. **Centipeda orbicularis**. Lour.—Flor. hgk. 186.

139. *Artemisia chinensis*. Lin. Sent to Linnaeus by Lagerstroem, who received the plant from China. *Absinthium maritimum Sinarum*. Pluk. Amalth. p. 3. **Tanacetum chinense**. A. Gray. Maxim. Dec. XI.

140. **Artemisia vulgaris**. L. This is the only Swedish plant in this country (Canton), though it varies in some measure with it. The Chinese heal wounds with it, and to that purpose apply the fresh plant bruised. They call it *gnai* Danes isl. Osb. 394.

*A. vulgaris* L. (*A. indica* Willd.) is very common throughout China. Sin 艾 ngai.

141. *Ethulia tomentosa*. Linn. China. D.C. VI. 110. **Artemisia lavandulacea**, which is identified by Maxim. Dec. XI. with *A. vulgaris*.

142. *Senecio divaricatus*. L. French. isl. Osb. 378.

D.C. VI. 301. **Gynura divaricata**. Only known from China.

143. *Cacalia incana*. L. French isl. Osb. 378.

Linnaeus' plant (from India) is dubious. **Gynura nitida**. D.C. VI. 299 ?

144. *Cacalia sonchifolia*. Linn. Ceylon. China. D.C. VI. 302. **Emilia sonchifolia**. Common in China.

145. *Lobelia zeylanica*. L. Danes island. Osb. 391.

Linn. confounds several species in his *L. zeyl.* and *L. trigona* Roxb. (Fl. hgk. 196.) is probably the plant Osb. saw in China. D.C. VII. 360.

146. *Black Ebony*, in Chin: *ghome* is brought to Canton from the E. Indies and from Maurice. Osb. 227.

Ebony sin: 烏木 *u muk* seems to be produced also in China. **Maba Ebenos**. Spreng.

147. *Nyctanthes hirsuta*. L. (description.) Canton, Honam Osb. 328. 16.

D.C. VIII. 302. *Jasminum pubescens*. Willd. Also in India (Roxbg.)

148. **Nyctanthes orientalis** (name given by Osb). Wood of Roses. Canton. Osb. 209.

149. *Quai fa*, a tree about 6 yards high with small, white, sweet scented flowers. Belongs to the Tetrandria class. Canton gardens. Osb. 14.

桂花 *kwai fa* is *Olea fragrans*. Thbg.

150. *Nerium Oleander*. Lin. Forster, Fl. sin. mentions it as known from China. I may observe, that the species generally

cultivated in China is **N. odorum**. Soland. the Oleander sinicus of Rumph. Introduced into Europe from India 1683.

151. **Periploca graeca**. L. Canton, French isl. The flowers are an ornament to our hot houses, on account of their velvet colour Osb. 336, 363.

The plant Osb. saw was hardly our European species.

152. *Fan sio* or *fay-sio*, **Convolvulus Batatas**. L. the Chinese potatoes, grow with long tendrils, which they extend along the ground. They never flower in China. Osb. 311.

**Batatas edulis**. Choisi. Sin: 番薯 *fan shü* (Canton). At Peking also the plant never flowers.

153. **Convolvulus reptans**. L. In Chin: *or-say*. It grows spontaneously everywhere in ditches and low places. We daily eat this spinage. Osb. 313.

Known from India before. *Olus vagum*. Rumph. According to Parker **Ipomoea reptans** Poir. is called 瓠菜 *ang tsoi* in Canton.

154. **Ipomoea Quamoclit**. L. In Chin: *kam fan fang*. It adorns the hedges without the city of Canton. Osb. 210.

Known from India before. Sin: 錦屏風 *Kan ping fung* (Parker).

155. **Convolvulus pes caprae**. L. French isl. Osb. 363.

Known from India before. Fl. hgk. 238. **Ipomoea pes caprae**. Sw.

156. **Convolvulus biflorus**. Linn. described it as a Chinese plant. **Ipomoea biflora** Pers. It does not seem that this plant has been observed after Linn.

157. **Convolvulus hederaceus**. L. Canton. Osb. 326.

**Pharbitis Nil**. Choisi. Common in tropical countries.

158. **Convolvulus hirtus**. L. with yellow flowers, in Chin: *ta qua*. Danes isl. Osb. 376.

Linn. describes it as an Indian plant. It is dubious. D. C. IX. 412. *C. farinosus*. L. ? But this has pink or rose coloured flowers. Perhaps *Ipomoea chryseidis* Ker. Fl. hgk. 239.

159. **Evolvulus alsinoides**. L. (description). Danes isl. Osb. 392.

Known from India before. Fl. hgk. 240.

160. They eat (at Canton) a reddish fruit like figs, but longer, and almost everywhere likewise thick, called *ay qua* or *kea*. Osb. 297.

This seems to be **Solanum melongena**. L. the Egg plant, in Chin: 茄 *ke* or 矮瓜 *ai kua* (Canton).

161. **Solanum aethiopicum**. Lin. (Forster Fl. sin.)

162. **Solanum indicum**. L. French isl. Osb. 357.

Known from Ceylon before.

163. *Solanum diphyllum*. L. French isl. Canton. Osb. 350. 328.

Linn.'s *Sol. diph.* is an American plant. But Osbeck's plant is the same as *S. biflorum*. Lour. *S. decemdentatum*. Roxb. *S. Osbeckii* Dun. D. C. XIII. 1. 178. 179. Fl. hgk. 242.

164. ***Capsicum frutescens***. L. Canton. Osb. 209.  
Known from India before.

165. *Lycium barbarum*. L. Honam. Osb. 16.

Loureiro's and probably also Osb.'s *L. barb.* are *L. chinense*. Mill. dict. 5 (1768.), which was cultivated in England as early as 1696 in the Roy. garden. (Hort. Kew 2. ed. II. 3). But there is much confusion in system. botany with respect to *L. barbarum*, *chinense* and *vulgare*. Meyen, obs. bot. notices *L. barbarum* as a plant of Macao. It seems to me that Hook. and Arn. (Voy. Beech. 267) are perfectly right in doubting, whether these species are really distinct.

166. ***Datura ferox***. Linn. mentions it as a Chinese plant. It was known before him (Ph. Miller cultivated it 1731) but it seems from India. *D. ferox* is common in N. China.

167. ***Nicotiana rustica*** L. (Turkish Tobacco, universally smoked in China. Osb. 319.

168. ***Nicotiana fruticosa*** is described by Linn. and Miller as a Chinese plant. But as Hooker has proved (Bot. mag. 6207.) it is a little known plant received from Guinea, Brazil and the Cape of G. H.

169. *Ruellia ringens*. L. Danes isl. Osb. 370.

Known from Ceylon and India before. D. C. XI. 69. ***Adenosma uliginosa***. R. Br. Osb. is quoted with a? Not observed, it seems after Osbeck in China.

170. *Gerardia glutinosa*. L. Danes isl. Osb. 370.

***Pterostigma grandiflorum***. Benth. Fl. hgk. 247. ***Adenosma grandifl.*** G. Pl. II. 349.

171. *Gratiola virginiana*. L. Canton. Osb. 329.

Linn. confounded under this name an American and an Indian plant. The latter is acc. to D. C. X. 389. ***Limnophila gratioloides***. R. Br. After Osb. not observed in China.

172. ***Torenia asiatica***. L. French isl. Osb. 354. 337.

It would seem from Osb.'s statement, that Toreen, after whom Linn. named this plant, gathered it near Canton, not in India, as Linn. states. It is also not mentioned in the list of Indian plants collected by Toreen at Suratte. As we shall see further on, Toreen was in Canton at the same time when Osbeck was there. It seems however that after Osbeck *T. asiatica* has not been observed in S. China. *T. rubens* and *flava* grow in Hongkong.

173. *Capraria crustacea*. Linn. China. D. C. X. 413. ***Vandellia crustacea***. Benth. Fl. hongk. 251.

174. *Ruellia antipoda*. Danes isl. Osb. 370.

D. C. XI. 155. ***Bonnaya veronicaefolia***. Spreng.



175. *Digitalis glutinosa* Gaertn. Nov. Com. Ac. Petrop. XIV. p. 544 (1770) China. D. C. IX. 275. **Rehmannia glutinosa**. Lib.

176. *Buchnera asiatica*. Linn. Ceylon, China. D. C. X. 503. *Striga hirsuta*. Benth. **Str. lutea**. Lour.

177. **Utricularia bifida**. L. (description). Danes isl. Osb. 1. Flora hongk. 256.

178. **Columnea**? **chinensis** (name given by Osb.) in Chin: *pan ge ka* is plentiful along the river side of Danes isl. Osb. 371.

I am not aware what plant is meant.

179. **Ruellia crispa**. L. (description) in Chin: *patt fa*. Danes isl. Osb. 390.

Linn. mentions it only as an Indian plant. It has not been observed in China after Osb.

180. **Barleria cristata**. L. French isl. Canton walls, in Chin: *ab key fa*. Osb. 181. 362.

Known from India before. Flora hongk. 262.

181. *Justicia purpurea*. L. (description) a new plant, in Chin: *hap key lee* or *hap key sa*. Danes isl. Osb. 372.

J. purp. was known to Linn. from the Moluccas and China **Rostellaria diffusa**. Nees. D. C. XI. 438. There is a great confusion with respect to the former name. Just. purp. of Loureiro 30 is *Peristrophe tinctoria* Nees. (D. C. XI. 493). Just. purp. Vahl is *Hypoestes purpurea* R. Br. Both of these plants have been observed in Southern China.

182. *Justicia procumbens*. L. Near Canton. Osb. 381.

Flor. hong. 265. **Rostellaria procumbens**. Nees.

183. *Justicia chinensis*. Linn. China. Flor. hgk. 266. **Di-cliptera chinensis**. Nees.

184. *Verbena nodiflora*. L. French isl. Osb. 363.

Known from Ceylon before. D. C. XI. 585. **Lippia nodiflora**. Rich. Not observed in China after Osb.

185. **Vitex negundo**. L. Canton. Osb. 330.

Known from India before. Fl. hgk. 273. According to Benth. *V. incisa*. Lam. from China, cultivated in Europe since the middle of the last cent. is only a cut-leaved form of *V. negundo*.

186. **Clerodendron fortunatum**. L. In Chin: *hatag nang*. Danes isl. (description) smells like musk. Osb. 369.

Known from Ceylon before. *Planta fortunata*. Herm. Mus. zeylan.

59. Dr. Hance add. Fl. hgk. 117.—Sin: 苦燈籠 *ku teng lung* (Parker.)

187. *Volkameria inermis*. L. Danes isl. Osb. 374.

Known from Ceylon before. Fl. hgk. 271. **Clerodendron inerme**. R. Br.

188. **Ocimum gratissimum**. L. Danes isl. Osb. 376.

Known from India before.

189. *Ocimum capitellatum*. Linn. Mant. 276. China. D. C. XII. 47. **Acrocephalus capitatus**. Benth. India orient. Not observed in China after the time of Linn.

190. *Scrophularia chinensis*. Lin. China. In D. C. X. 317 we read: Scr. chin.=*Celsia coromandelina* Vahl cum **Salvia plebeja**. R. Br. The latter is a common plant in China. Fl. hgk. 277.

191. **Monarda chinensis**. (name given by Osbeck, description.) Danes isl. Osb. 391.

192. *Hyssopus Lophanthus*. Linn. North-China. D. C. XII. 369. **Lophanthus chinensis** Benth. Ledebour Fl. ross. III. 372. Altai mountains, Transbaicalia. Not observed in N. China after the time of Linn. But another species, *Lophanthus rugosus*. Fisch. is cultivated at Peking.

193. **Scutellaria indica**. L. (description). In Chin: *tim gam sa*. not described before by any botanist. Danes isl. Osb. 3.

Pluken. Amalth. 190. *Scutellaria sinica*.

194. **Leonurus sibiricus**. Linn. Sibiria. China. This is a common weed throughout China.

195. **Plantago asiatica**. Linn. Sibiria. China. Common in temperate Asia. According to Dr. Regel a variety of *Pl. major* L.

196 *Mirabilis odorata*. L. grows as nettles grow in our country. Canton. Osb. 326.

D. C. XIII. 2. 428. **M. dichotoma**. L. of American origin. Much cultivated in Peking.

197. *Valeriana chinensis*. Linn. French isl. Osb. 353.

D. C. XIII. 2. 455. **Boerhavia repanda**. Willd. Also in India.

198. **Celosia argentea**. L. Danes isl. Canton. Grows as a weed. Osb. 336.

First described by Linn. in the Hort. Cliff (1737).

199. **Celosia cristata**. L. in Chin: *lat-sio*. Canton. Osb. 209.

This is only a variety of *C. argentea*. Known from India before. Osbeck's Chin. name is wrong. *Lat tsin* is Cayenne Pepper in Cantonese.

200. **Amarantus cruentus**. Linn. China. Known before Linn. Amar. sinensis. Martyn cent. 6. (1728.)

201. **Amarantus tristis**. L. in Chin: *in soy*. Its leaves are used instead of kale. French isl. Osb. 350.

Known from India before. 莧菜 *in ts'oi* is a general name for *Amarantus*.

202. *Achyranthes lappacea*. L. Canton. Osb. 329.

Known from India before. D. C. XIII. 2. 331. **Pupalia lappacea**. Mocq.

203. **Achyranthes aspera**. L. Canton. Osb. 336.

Known from India before. Fl. hgk. 285.

204. **Achyranthes chinensis**. (name given by Osb. botan. description.) Canton. Osb. 329.

205. **Gomphrena globosa**. L. Canton. Osb. 209.

Known from India before. Introduced in Europe 1714.

206. *Spinage* is called *bout-say* in Canton. Osb. 313.

The Chin. name for *Spinacia oleracea*. L. is 菠菜 *po ts'oi*.

207. *Chenopodium scoparium*. Linn. China. D. C. XIII. 2.

130. **Kochia scoparia**. Schrad. Common weed in North-China.

208. **Basella alba**. Linn. China. Known also from the Indian Archip. Japan. After Linn. not mentioned for China.

209. **Basella rubra**. L. in Chin: *tand soy*. The spots which the berries make in white linen are very hard to be got out. Canton factory. Osb. 12.

Known from India before. Sin: 藤菜 *t'ang ts'oi* (Parker) Flor. hgk. 283.

210. **Polygonum barbatum**. L. in Chin: *ka yong moea*. French isl. Osb. 353.

Common in S. China.

211. **Polygonum orientale**. L. in Chin: *yong moea*. French isl. Osb. 353.

Known from India before. Common in China.

212. **Polygonum chinense**. L., in Chin: *ka yong ma*. Danes isl. Canton. Osb. 393. 330.

Common in S. China. Sin: 火炭毛 *fo than mu*. (Parker.)

213. **Rheum palmatum**. Linn. China. Seeds of the true Rhubarb plant, observed in 1872 near lake Kukonor by Col. Przewalsky, were first received in Kiakhta, in 1750, and since that time the plant is cultivated in Europe.

214. **Rheum undulatum**. Linn. *Rhabarbarum sinense* Amman Herb. 206. The seeds of this had been received in 1740 from Siberia, its native country. Linn., who thought, that it was of Chinese origin, described it under the name of *Rh. Rhabarbarum*.

215. **Rheum compactum**. Linn. gives as habitat China, Tartary. It is stated to have been introduced in 1758 from Tartary. Pallas observed it in Dauria. It is not found in China.

216. **Piper betle**. L. Canton. Osb. 314.

Fl. hgk. 335 describes the *Chavica sarmentosa*. Miq. which is very near the *Chav. betle*. But the true Betle pepper is also cultivated in S. China.

217. A Chinese told to Osb. that the Camphor tree, **Lauurs Camphora**, was found near Canton, and called *tyong sio*. Osb. 253.

This tree was known to Linn. only from Japan. Sin: 樟樹 *tiong sio* (Fu chou dialect.)

218. **Cassytha filiformis**. L. Climbs on the Euphorbia. Danes isl. Osb. 395.

Known from India before.

219. *Daphne indica*. L. (description.) Danes isl. Osb. 6.

D. C. XIV. 543. **Wickstroemia indica**. C. A. M. Not found in India.

220. **Loranthus scurrula**. Linn. China. According to Benth. Fl. hgk. 141 this is probably the *L. chinensis*. D. C. gathered by Staunton in China, but not as Linn. thinks the species represented in Petiver's *Gazophyl.* Tab. 63, fig. 8.

221. **Viscum baccis rubentibus**. Kaempf. amoen. 785. French isl. Osb. 353.

Kaempfer's plant, quoted by Osb. is *V. Kaempferi*. D. C. IV. 285. The Fl. hgk. 141 notices for Hongkong *V. articulatum*. Burm. and *V. orientale*. Willd.

222. **Euphorbia nerifolia**. L. used for hedges. Canton. In Chin: *fu yong fa*. Osb. 328, 336.

Known from Ceylon, India, before. Sin: 火秧花 *fo yong fa* (Parker.)

223. *Andrachne fruticosa*. L. Danes isl. Osb. 368.

Flor. hgk. 313 *Melanthesa chinensis* Blume. G. P. III. 276. **Breynia fruticosa**.

224. *Agyneia pubera*. L. and *Agyneia impubes*. L. Both known to Linn. as Chinese plants. D. C. XV. 2. 307 considers the second to be only a variety of the first, as do also Benth. and Hook. G. P. III. 271. Müller in D. C. l. c. refers both to **Phyllanthus puber**, of which he enumerates 4 varieties. Two of these have been observed in China by Fortune and others, but for the above mentioned varieties Müller quotes only Linnaeus.

225. **Phyllanthus niruri**. L. Danes isl. Osb. 2.

Known from Ceylon before.

226. *Croton tomentosus*. Müll. D. C. XV. 2. 588. states that he has seen in Linnaeus' herbarium a specimen of this plant brought by Osbeck from China. It seems that Osbeck does not mention it. **Croton crassifolius**. Geisel is the oldest name and must be restored. *Cr. chinense* Bth. Fl. kgk. 309. is the same.

227. *Croton sebiferum*. L. a little tree, which the Chinese call *o-ka-o*, and at first sight looks like an asp. It has yellow flowers. Danes and French isl. Osb. 359, 5.



*Stillingia sebifera*. Mchx. Sin: 烏桕 *u kau*.

228. *Humulus lupulus*. L. Canton. Osb. 336.

This is *H. japonicus*. S. et Z. common throughout China.

229. *Ficus indica*. L. with round figs. Canton wall. Osb. 381, 215.

This is probably *Ficus retusa*. L. the Bastard Banyan, very common in S. China; also in India.

230. *Ficus pumila*. Linn. China (Forster Fl. sin.) known also from Japan, introduced in Europe 1759. Loureiro mentions it only for CochinChina. It is not found in the Fl. hongk. But Dr. Hance has seen specimens of it from Formosa.

231. *Morus alba*. Linn. China.

232. *Urtica nivea*. L. on the walls of Canton. Osb. 215, 381.

Known from India before. *Boehmeria nivea*. Hook. and Arn. Flora hkg. 331.

233. *Thuja orientalis*. L. Canton. Osb. 209.

Known to Linn. from China before, described in the Hort. Cliff (1737) Seeds received from China. *Biota orientalis*. Endl.

234. *Juniperus chinensis*. Linn. Mant. (1767). China.

235. *Latt fa* is the Chinese name of a little tree (Canton), which looks like the Yew tree, but the leaves are ornamented on the inferior side with white strips, running length-ways as in *Pinus balsamea*, or the *Phalaris picta*. It seems to be *Taxus nucifera*. L. or the *Fi* of Kaempf. Amoen. 814.

The Japanese tree alluded to by Osb. is *Torreya nucifera*. S. et Z. not found in China, as far as I know. But *Torreya grandis* has been observed by Fortune in Chekiang. D. C. XVI. 2. 505.

236. *Abies chinensis*. Chinese pine. French isl. Osb. 348. The timber of which their ships are built is called *sao mock*. Osb. 196. *Shau pann* is the Chinese name of that sort of wood, from which they make coffins. Osb. 228.

All these names refer it seems to *Cunninghamia sinensis*. R. Br. D. C. XVI. 2. 432. Sin: 杉木 *sha muk*. Boards of that timber are called 板 *sha pan*.

#### MONOCOTYLEDONS.

237. *Musa paradisiaca*. L. Plantain tree, called *Tseu* by the Chinese. Canton. Osb. 308. In a note Forster states, that the plantain tree has flowered for the first time in the Upsal garden, and has also brought forth ripe fruits.

The Chinese name of the Plantain, which is cultivated in S. China, is 蕉 *tsiu*.

238. *Musa Cliffortiana*. L. Canton. Osb. 341.

There is no difference between this and *M. paradisiaca*.

239. **Canna indica.** L. Canton. Osb. 330.  
A native of India, frequently cultivated in China.
240. *Maranta Galanga.* Linn. China. *Galanga major.* Rumph.  
**Alpinia Galanga.** Swartz. Fl. hgk. 348.
241. **Curcuma chinensis.** (name given by Osb.) Canton. Osb. 329.
242. *Epidendron ensifolium.* L. planted in flowerpots. Its flowers have an exceeding fine scent. Canton. Osb. 15.  
*Cymbidium ensifolium.* Sw. Much cultivated in China.
243. *Ixia chinensis.* Linn. (Forster Fl. sin. from China) cultivated 1759 by Ph. Miller. **Pardanthus chinensis.** Ker.
244. **Narcissus Tazetta.** L. flowers in January. Canton. In Chin: *soi sinn fat.* Osb. 209.  
Frequently cultivated in China. Sin: 水仙花 *shui sin fa.*
245. **Dioscorea alata.** L. Yams, in Chin: *tdai sio.* Cultivated, Canton. Osb. 311.  
Known before from Ceylon, India. Sin: 大薯 *t'ai shu* (in Canton.)
246. **Convallaria chinensis.** Osb. 353. Canton.  
I am not aware what plant is meant.
247. **Smilax China.** L. China root, in Chin: *long fan tao.* It grows near the river on dry hills and is very cheap in Canton. Osb. 255. 9.  
Cmp. Hance Add. Fl. hgk 130.
248. **Smilax Sassaparilla.** L. Danes island. Osb. 10.  
It was certainly not this American species, which Osb. saw there.
249. *Dracaena ferrea.* L. The Iron tree (description.) in Chinese *tat sio.* Canton gardens. Osb. 14.  
**Cordylina Jacquini.** Kth. V. 24. Sin: 鐵樹 *tih shü.*
250. Two sorts of *Leek* are cultivated at Canton, viz. *tsong* and *lo fra.* Osb. 309.  
By the first sound evidently 葱 *tsung*, *Allium fistulosum.* (Peking.) in intended.
251. **Hemerocallis fulva.** Linn. China. Common in China, cultivated and wild.
252. **Commelina communis.** L. Danes isl. Osb. 393.  
Known from Ceylon before. Common in China.
253. **Commelina chinensis.** (name given by Osb.), in Chin: *Katyaa.* Danes isl. Osb. 393.
254. *Oo tao* are roots so called by the Chinese. They cannot be eaten raw because the acidity would prevent the action of swallowing. Osb. 310.

The name of 芋頭 *u tau* is applied to several species of *Colocasia* with edible tubers, viz: *C. esculenta*. Schott., *C. antiquorum*. Schott., *C. indica*. Kth.

255. *Lemna*. Honam. Osb. 17.

Probably *Lemna minor*. L., which is very common in China.

256. *Sagittaria* *bulbis oblongis*. Canton. In Chin: *succoyee* *fa*. Osb. 334.

We know two species of *Sagittaria* from S. China, viz: *S. chinensis*. Sims. and *S. cordifolia* Roxb. Fl. hgk. 346. I think it is the former which is largely cultivated in China for the sake of its edible roots under the name of 茨茹 *tsz' ku*,—*Sagittaria trifolia*. L. (China.) is according to Kth. III. 157. perhaps *S. chinensis*.

257. *Eriocaulon sexangulare*. L. Near Canton. Osb. 386.

Known from Ceylon before. Hance Add. Fl. hgk. 130.

258. *Cyperus Iria*. L. ? Danes isl. Osb. 371.

Known from India before. Fl. hgk. 386. Common in China.

259. *Cyperus haspan*. L. Danes isl. Osb. 376.

Known from India before. Fl. hgk. 386. Also in America.

260. *Cyperus oderatus*. L. French isl. 361.

This is an American species.

261. *Cyperus dichotomus*. L. ? Danes island. Osb. 371.

This name is not found in Kth. enum. pl.

262. *Cyperus rotundus*. L. Whampoa. Osb. 199.

Flor. hgk. 387. Widely diffused, New and Old World.

263. *Scirpus glomeratus*. L. Canton. Osb. 326.

Known from India before. Kth. enum. II. 133. *Kyllingia triceps*. Rottb.

264. *Scirpus chinensis*, culmo triquetro subnudo. Rheede Malab. XII. 71, motto pulla. French isl. Osb. 354.

Kth. II. 202. identifies the motto pulla with *Scirpus squarrosus*. L. or *Isolepis squarrosa*. Roem. Schult, an Indian plant, not found in China. But Bth. Fl. hgk. 389. states that *Lipocarpa microcephala* R. Br. found in Hongkong, closely resembles the former. Osbeck's *Sc. chinensis* is not to be confounded with *Sc. chinensis* Munro. Fl. hgk. 395.

265. *Saccharum officinarum*. L. Sugar Cane. In Chin: *kee a*. French isl. Cultivated. Osb. 350.

266. *Saccharum chinense* (name given by Osb.) grows in the river (Canton) like reeds. In Chin: *mao*. Osb. 10.

茅 *mao* is according to Lour. 67 *Saccharum spicatum* L. or *Perotis latifolia* Ait. Fl. hgk. 418. Osb.'s plant is not to be confounded with *Saccharum chinense*. Roxb.

267. *Saccharum pluviatile* (not a Linnaean name), Whampoa. Osb. 199.

268. **Andropogon schoenanthus.** L. Canton. Osb. 346.

Known from Ceylon, India before.

269. **Andropogon ischaemum.** L. Canton. Osb. 346.

Europa, Siberia. Frequent in N. China.

270. *Andropogon fasciculatum.* L. Canton. Osb. 346.

Kth. I. 265. *Chloris radiata.* Sw. an American plant.

271. **Ischaemum aristatum.** L. Danes isl. Osb. 376.

It is found also in India but has not been observed in China since the time of Linn.

272. **Apluda mutica.** L. Canton. Osb. 330.

Fl. hbk. 422. Found also in India.

273. *Panicum crus galli.* L. Canton. Osb. 346.

European species, the same as *P. crus corvi.* L. Also common in China.

274. **Panicum alopecuroides,** L. Danes isl. Osb. 375.

Kth. I. 163. *P. Linnaei.* India orient.

275. *Panicum arborescens.* L. Canton. Grows from 10 to 12 feet high and is very ramose. Osb. 330.

Known from Ceylon before. Kth. I. 426. *Arundinaria glaucescens.* Beauv.

276. **Panicum glaucum.** L. Danes isl. Osb. 374.

Flora hbk. 411. Europa, Asia.

277. **Panicum patens.** L. Canton. Osb. 346.

Kth. I. 126. India orient.

278. *Panicum dissectum.* L. Canton. Osb. 346.

This is a plant of S. America. Forster Fl. sin. means, that Osb. probably saw *P. dimidiatum.* L. (India orient.)

279. **Panicum brevifolium.** L. Canton. Osb. 346.

This is a plant of Mexico.

280. *Alopecurus hordeiformis.* L. Danes isl. Osb. 376.

Kth. I. 158. *Gymnotrix cenchroides.* Roem. et Sch. *G. hordeiformis.* Nees. India orient. C. B. Sp. Peking (Hance.)

281. **Oryza sativa.** L. The Chinese call the Rice *waa*, while it is yet in the ground. Osb. 350.

禾 *wo*, growing grain, Paddy in the southern provinces (Williams.)

282. *Kow-sonn* is the Chinese name of white, long roots, of the thickness of Parsneps, the extremes of which had been cut off, and with which a sampan, that passed by, was quite filled. They were tied into bunches with their ensiform leaves, and were offered to sale. Osb. 11.

I have no doubt, that Osb. saw *Hydropyrum latifolium.* Griseb. the basis of the stem of which is a vegetable much in esteem among the Chinese. Comp. Dr. Hance's interesting article on the subject. Journ. Bot. 1872. 146. The Chinese call it 茭 茅 *kao sun*. It is cultivated in Peking as well as in Canton, and grows wild in Southern Siberia.



283. *Agrostis indica*. L. Canton. Osb. 346.

Widely diffused over the warmer regions of the globe. Fl. hgk. 426.  
*Sporobolus indicus*. R. Br.

284. *Aira seminibus hirsutis, aristis terminalibus flore longioribus*. French isl. Osb. 354.

*Eriachne chinensis*. Hance. Add. Fl. hgk. 136.

285. *Holcus latifolius*. L. Danes isl. Osb. 8.

Kth. I. 366. *Centotheca lappacea*. Desv. Found also in India, the Indian Archip., Australia.

286. **Briza elegans** (not a Linnaean name). Canton. Osb. 6.

287. *Poa chinensis*. L. Canton. Osb. 330.

It seems, that this is the *Leptochloa chinensis*. Nees. Fl. hgk. 430. Nees gives as synonym *P. chinensis*. Roth. See Kth. I. 270.

288. **Poa malabarica**. L. Canton. Osb. 29.

Kth. I. 365. India orientalis.

289. **Poa angustifolia**. L. French isl. Osb. 378.

European species.

290. *Poa tenella*. L. Canton. Osb. 330.

Known from India before. Fl. hgk. 431. *Eragrostis tenella*. Beauv.

291. *Cynosurus aegyptiacus*. L. Danes isl. Osb. 376.

Common weed in warm countries. *Eleusine cruciata*. Lam. *Dactyloctenium aegyptiacum*. Willd.

292. *Arundo Bamboo*. L. Bamboo roots is what we call Asia, when preserved with salt, vinegar, leek, and Capsicum. Paper is made of the inner bark of Bamboo. Osb. 310, 276.

Munro in his article on Bambusaceae (Trans. Lin. Soc. XXVI.) states, that the Chinese bamboo of which Osbeck speaks, which is said to flower once in 60 years, is *Bambusa flexuosa* Munro, gathered also by Staunton.

293. A reed which the Chinese call *lu ta*. It looks like **Arundo Donax**. Near Bocca Tigris. Osb. 29.

蘆筴 *lu ta* (Williams' Dict. p. 840). Comp. also Dr. Hance Journ. Bot. 1879. p. 99.

294. **Nardus articulata**. (name given by Osb.) Canton Osb. 346.

295. **Nardus ciliaris**. L. French isl. Osb. 353.

Kth. I. 461. species dubia. India orient.

#### CRYPTOGAMS.

296. **Lycopodium cernuum**. L. French isl. Osb. 356.

Common throughout the tropics.

297. **Lycopodium nudum**. L. French isl. Osb. 356.

East and West Indies.

298. **Lycopodium varium**. French isl. Osb. 356.

This is not a Linnaean name. *L. varium*. R. Br. is an Australian plant and has probably nothing to do with Osbeck's plant.

299. *Ophioglossum scandens*. L. In Chin : *ka yin sey*. Danes isl. Osb. 375.

Known from Ceylon before. Fl. hgk. 441. *Lygodium scandens*. Sw.

300. *Polypodium varium*. L. Danes isl. Osb. 9.

Known also from India. Hce. Add. Fl. hgk. 140. *Aspidium varium*. Sw.

301. *Polypodium Barometz*. L. French isl. Osb. 356.

*Cibotium Barometz*. J. Sm. India, China. Add. Fl. hgk. 143.

302. *Polypodium cristatum*. L. French isl. Osb. 356.

This is an European species. *Aspidium cristatum*. Sw.

303. *Pteris semipinnata*. L. In Chin : *ka lao*. Danes isl. Osb. 375. New plant.

Fl. hgk. 448. China. India.

304. *Pteris vittata*. L. Canton walls. Osb. 381. New plant.

305. *Acrostichon punctatum*. Lin. China. (Forster Fl. sin.)

306. *Acrostichon dichotomum*. Lin. China (Forster Fl. sin.)

307. *Adiantum flabellatum*. L. (description) in Chin : *siag mao quang*. Danes isl. Osb. 7.

*Adiantum chinense perelegans*. Pluk. Alm. 11 (see above). Common in S. China.

308. *Blechnum Orientale*. L. French isl. Osb. 375.

Flor. hgk. 444. Also in India.

309. *Onoclea sensibilis*. L. or *Filix indica*, *Polypodium facie*. Menz. pag. 6. tab. 10. Danes isl. Osb. 371.

This is an American species.

310. *Trichomanes chinensis*. L. Danes isl. French isl. A new plant. Osb. 357, 9.

*Davallia chinensis*. Sw.—Sprengel Syst. IV. 120 refers to this species also *Adiantum chusanum*. Linn. Syst. veg. p. 940.

311. *Jungermannia chinensis* (name given by Osb.). See Dill. Musc. t. 49. fig. 4. French isl. Osb. 356.

312. *Lichen chinensis*. Osb. French isl. Osb. 356.

313. *Lichen parietarius*. L. ? or very like our *L. parietarius*. Danes isl. Osb. 8.

314. *Lichen* (Euphorbiae.) *foliaceus pulverulentus*. French isl. Osb. 378.

315. *Agaricus chinensis*. Osb. French isl. Osb. 356.

316. *Boletus favus*. Linn. China.

317. *Sium*. Chinese Truffles are carried for sale in the streets of Canton. Osb. 312.

草 *sun* is a general term for Mushrooms. Comp. Loureiro 849. *Agaricus deliciosus*.

318. **Byssus flos aquae**. Linn. (Forster Flora sin.)

319. **Fucus Tendo**. Linn. China.

*Dubious Chinese plants mentioned by Osbeck.*

*Cryptanthus chinensis*. Small bushes bearing a great resemblance to Blackberry bushes. Leaves opposite, as large as those of the Rosemallow, cordated, obtuse; their margin is unequally serrated, they are somewhat rough at the top, but smooth below and have at least 8 pretty large veins. The flowers are white, double and grow in bunches at the top of the branches. Near Canton. Osb. 345.

There is no Linnaean genus *Cryptanthus* and the genus of this name proposed by Nuttall (Salsolaceae) is even not mentioned in the Gen. Plant.

For the food of gold and silver fishes a species of plant is put into the water, the leaves of which resemble *Ceratophyllum demersum* and *Pistia stratioides*. They call it *Siu yan gai*. Osb. 208.

Large high trees called *lean see*. Canton. Osb. 325.

*Laan fu* a tree with yellow corymbose flowers and pinnated leaves. Canton gardens. Osb. 14.

*Ka tong qua*, a shrub, which twists round other plants. Leaves heart-shaped, thick. Corolla 4 fid, 4 filaments, 1 pistil. Danes isl. Osb. 374.

*Kay in*. Leaves lanceolate and woolly on the under side. Flowers blue. 4 filaments. Pistil longer than the filaments. Danes isl. Osb. 374.

*Ko su* or *Yam ko sua* is the name, which the Chinese give to the great trees, which grow near the plantations. Osb. 9.

*Pa lamm* is the name of the leaves with which they cover their fruit baskets. Osb. 9.

*Ka toa* is a long climbing plant with round leaves and red flowers. Danes isl. Osb. 394.

**OLAF TOREEN**, Chaplain of the *Gothic Lion*, a Swedish East India man, visited Canton at the same time, when Osbeck was there. The *Gothic Lion* anchored at Whampoa on the 7. July 1751 and left the 4. Janr. 1752. Toreen presented to Linnaeus, his instructor, a collection of Indian plants, chiefly from Suratte, where he had made a stay.

of more than 5 months. It would seem that he gathered also some Chinese plants. I have already stated (see above Linn. Chin. plants. 172.) that *Torenia asiatica*, named by Linnaeus after Toreen, was probably brought from China, not from India. In D. C. V. 543 I read under *Pluchea* (*Conyza*) *hirsuta*: China (Torr. ex Linn.) I cannot now refer to Linn.'s original work in order to decide whether Toreen is quoted. Toreen died a year after his return to Sweden. Linnaeus published the letters Toreen had addressed to him during his voyage. In his narrative there is nothing of interest concerning Chinese botany. He speaks of some cultivated plants and reports, that the Tea shrubs he took with him on his return, died, on the road, notwithstanding his care.

The third account of Swedish naturalists in China translated by Forster, is a Treatise on **CHINESE HUSBANDRY** by **CHARLES GUST. ECKEBERG**. Eckeborg was Captain of a Ship in the Swedish E. I. Comp.'s service. We know from Sparrmann's brief account of his voyage to China, (see further on) that Eckeborg was Captain of the *Navarcha* and that this ship arrived at Canton Aug. 24. in 1766. It was at this place, that Eckeborg made his observations on Chinese husbandry, on which subject he subsequently published a very interesting account, of which I shall give an abstract. It seems that E. had previously visited Canton, about 1762.

E. states that *Rice* is largely cultivated in the neighborhood of Canton. But he saw also *Wheat* there and *Barley*.

He mentions a coarse species of plant, with thin roots, whose leaves, flowers and seed capsules were like those of *Radishes*. These were sown in the beginning of Dec. In Febr. they were all in blossom, but in April the seed capsules turned yellow, and then the plants were plucked, dried, and the numerous seeds beaten out. From the seeds they press an oil, which they turn to many purposes in economy, but especially they burn it in lamps, and dress several dishes with it while it is fresh. The oil is so fat, that it cannot be used in painting, because it will not dry. The soot which comes from the lamps in which this oil is burnt is used in making the well known Indian ink.

The plant here alluded to is the *Raphanus chinensis annuus oleiferus*. L. *Raphanus sativus*, var. *oleifera*. D. C. I. 228. It is stated in the Collect. acad. partie étrang. XI. 379 (quoted by Grosier, la Chine III. 234. I have not seen the original.) that the seeds of this plant, which the Chinese cultivate under the name of *sui fa* or *sui fa tun*, had been supplied



by Ekeberg and sown in Sweden, where they produced a good crop. I am not prepared to say what Chinese name is intended by *sui fa tun*. Evidently it has been incorrectly rendered.

It seems to be the same plant, which Osbeck II. p. 29 mentions. 21. Dec. 1752. The high fields about Bocca Tigris (mouth of the Canton river) were green with a plant out of whose seeds the Chinese press the oil, which they call *loam*, and which is most probably *Sesam*.

Fortune (Wander. 55.) states, that the Cabbage oil plant of the Chinese in Chusan, Chekiang, Kiangsu is *Brassica chinensis*. L.

Commonly the seeds of *Cotton*, which they call *min foo* succeed to those oily seeds. They are sown in April. Flowers appear in July, pods in August.

The Cotton plant, 棉花 *min fa*, in Canton.

*Potatoes*, which they call *foe cee* make the third and last crop, which they plant after the cotton crop being over. These potatoes are different from ours. The roots have red peels, are longer, yellow, sweet, but the leaves are like those of European potatoes.

E. means evidently *Batatas edulis*. Chois (s. above Lin. Chin. pl. 152.) sin: *fan shü*, but he is mistaken with respect to the leaves.

Sometimes the place of Cotton is supplied with lentils, beans *Locktaws* and *Calvanses*.

*Luktaw* is *Phaseolus radiatus* L. (Lin. Chin. pl. 74.) *Calvanses* = *Dolichos sinensis*. L.

*Yams*, which they call *ou tau* are planted like potatoes but set in swampy wet places.

*Colocasia* (Lin. Chin. pl. 254.)

After this some particulars with respect to the cultivation of the *Sugar cane* by the Chinese are given.

In the kitchen gardens they cultivate *Salads*, long and short *Cucumbers*, *Leeks*, white *Onions*, *Spinage*, *Celery*, *Carrots*, *Orach*, a species of watery *Turnips*, long *Radishes*, *Gourds*, and *Water melons*. Of these they have procured the seeds from the Portuguese. *Purslane* grows wild. They keep a coarse sort of *Water Spinage* in ponds about  $\frac{1}{2}$  fathom deep, in which it grows so plentifully, that it quite covers the surface of the water. This is one of the most usual pot herbs.

This Water spinage seems to be *Ipomoea reptans*. Poir. See above Lin. Chin. pl. 153.

After this E. speaks of the cultivation of *Ginger* and of *Tobacco*, *yeen* of the Chinese.

They cultivate a plant, which they call *fock yong*, not unlike *Mint*, but with paler leaves. They value this plant very highly and sell the pekul of it for 50 tael. It is said to be of great service in consumption.

Perhaps 藿香 *hok hong*, which Lour. 441 thinks to be a *Betonica*. In Peking *Lophanthus rugosus*. Fisch. is cultivated under this name.

The greater and the less *Palma Christi* (the less in particular *Ricinus*) is planted everywhere. The kernels being pressed afford a white clear oil.

Instead of cabbage they use a plant with great coarse leaves like those of Burdock, all issuing out of a little root. The yellow flowers, the stalk with the pods, and the seeds themselves are like *Cale*. They daily use this plant and therefore it goes off so fast, that they immediately sow the void beds with it again. It grows very fast in all seasons. They boil and dry it and take it with them upon sea voyages.

Besides this the Tartars of Peking have a species of *White Cale* with long, narrow heads, which is scarce in Canton.

The first mentioned is probably *Sinapis brassicata*. L. (Lin. Chin. pl. 10.) which is distinguished by its large leaves, the second *Brassica chinensis*. L. which does not form heads.

Eckeb. then enumerates the following fruits: *Citrus decumana*, sweet Oranges, which come to great perfection in Fokien, Amoy, little sour Citrons, Leicki, Lonyan, Mango trees, Olives, Pear-and Apple trees, and likewise Grapes.

The *Bettle* bushes grow spontaneously without being planted.

I may finally mention, that according to Linnaeus Eckeb. was the first, who succeeded in bringing a living *Tea* shrub to Europe, which Linn. received 3. Oct. 1763.

Lindley Rosar. Monogr. 108 quotes Eckeb. in connection with *Rosa semperflorens*. Curt. China.

Sparrmann has dedicated to Eckeb. a new genus of plants, *Eckeb. Meliaceae*.

A small collection of S. Chinese plants was made by **Andreas Sparrmann** in 1766. A brief account of his voyage to China and his botanical investigations there is found in Linnaeus' *Amoenitates academ.* vol. VII. 1769. p. 497—506. Sparrmann, born 1747, a Swedish botanist and traveller, visited besides China also the Cape of G. H. (1771—72). He died 1787 and has written many botanical articles in the *Act. acad. holm.* and in *Nov. act. soc. Upsal.* Linn. fil. dedicated to him the genus *Sparrmannia* (*Tiliaceae*.) As to his voyage to China he states that Capt. Eckeb. had invited him to accompany him. Their ship, the *Navarcha* passed by Macao 24. Aug. 1766 and anchored not far from the city of Canton 26. Aug. Sparrmann enumerates the following plants gathered at that place:

- |  |  |
|--|--|
| <i>Thea Bohea</i> . Linn. Chin. pl. 16.          | <i>Polygonum chinense</i> . l. c. 212.     |
| <i>Ixora coccinea</i> . l. c. 118.               | <i>Torenia asiatica</i> . l. c. 172.       |
| <i>Rhamnus lineatus</i> . l. c. 48.              | <i>Aralia chinensis</i> , sed tota glabra. |
| <i>Baeckea frutescens</i> . l. c. 85.            | l. c. 109.                                 |
| <i>Triumfetta Barthramia</i> l. c. 31.           | <i>Verbesina calendulacea</i> . l. c. 135. |
| <i>Urena procumbens</i> . l. c. 24.              | <i>Cucurbita citrullus</i> . l. c. 101.    |
| <i>Barleria cristata</i> . l. c. 180.            | <i>Hedysarum biarticulatum</i> . l. c. 68. |
| <i>Hedyotis fruticosa</i> . D. IV. 123.          | <i>Tamarindus indica</i> . l. c. 79.       |
| <i>Planta dubia</i> . <i>Spermacoce</i> ?        | <i>Citrus decumana</i> . l. c. 41.         |
| <i>Sinapis brassicata</i> . Linn. Chin. pl. 110. | <i>Citrus aurantium</i> . l. c. 34.        |
|  | <i>Bromelia Ananas</i> .                   |

In my notice of the services rendered by Swedish naturalists with respect to the investigation of Chinese Botany, I ought not to omit mentioning the name of **MAGNUS VON LAGERSTROEM**, born in 1696. He was an ardent naturalist and a friend of the Great Linnaeus. His position as Director of the Swedish East India Comp. at Gothenburg enabled him to procure many rare objects of natural history from India and China, which he used to present to Linnaeus. He died in Gothenburg in 1759. Linnaeus dedicated the genus *Lagerstroemia* to his friend. Toreen in his letters repeatedly speaks of Lagerstroem.

There is in Linn. Amoen. acad. IV. p. 230—266 a paper by J. L. Odhelle, written in 1754, devoted to the *Chinensia Lagerstroemiana*. The author reports, that Lagerstroem had obtained from India not only dried specimens of plants, but had also succeeded in introducing living plants from those distant countries into the botanical garden of Upsala. He enumerates namely: *Cocos*, *Phoenix*, *Cycas*, *Saccharum*, *Pentapetes*, various species of *Hibiscus*, *Sanguis Draconis*, *Bambu*, *Conyza*, *Amaranthus*, *Arum chinense* (I do not know to what plant the last name refers. There is no Chinese *Arum* in Linn. Spec. Plant.)

Besides this, Lagerstroem is stated to have been possessed of a *Botanicon chinense*, written in Chinese characters, in 36 volumes, of which 2 volumes contained engravings of plants, beasts, and minerals. (This was probably the well known *Pen ts'ao kang mu*.) Lagerstroem had moreover received from China a collection of about 1000 Chinese drugs.

#### IV. EARLY RESEARCHES INTO THE FLORA OF PEKING.

Let us return again to the Jesuit missionaries and continue to illustrate the services they have rendered in extending our knowledge of the vegetable products of China.

We have first to consider in this chapter the merits of Father **Petrus d'Incarville** in having sent to Europe dried plants and seeds from North-China. He was a Frenchman born in 1706. In 1740 he joined the Chinese mission of the Jesuits and died in 1757 at Peking, where he seems to have labored during the whole period of his sojourn in China. D'Incarville's name has been repeatedly inscribed in the annals of botanical science. From the seeds of various Peking plants procured by him a number of interesting new species, now-a-days much cultivated in Europe, have been raised. A. L. de Jussieu dedicated to him the genus *Incarvillea* represented by one species only, the *I. sinensis*, a beautiful Bignonaceous plant with large scarlet flowers, met frequently with in the Peking plain and in the mountains, towards the end of summer.

Besides this, D'Inc. transmitted to his instructor Bernhard de Jussieu in Paris a collection of dried Peking plants. I am not aware to what number of species this collection amounts. It has been incorporated with the herbarium of the Museum of Paris, but has never been worked up in any regular form. Only a few new plants of it have been occasionally selected for publication by French botanists, and, it is strange to say, from 30 to 80 years and more after the specimens were received in Paris. As far as I have been able to trace out from various botanical works, the name of Inc. is connected with the following Chinese plants, of which he has supplied dried specimens or seeds.

1. **Ailantus glandulosa.** Desf. Inc. first mentions this tree under the name of *Frêne puant* (stinking Ash.) in a memoir on Chinese wild silkworms, published a long time after his death by Cibot in the 2d vol. of the *Mém. conc. les Chin.* (1777.) p. 583. According to Loudon (*Arb. et Frut.*) seeds of this tree, sent by d'Incarville, had been received in England in 1751. It was cultivated in France also, but described for the first time by Desfontaines only in 1786.

2. **Cedrela sinensis.** Adr. Jussieu. Inc. mentions this tree in the above quoted memoir, p. 583, as *Frêne odorant*. From the dried specimens of it sent to Bernh. Jussieu in 1743, Adr. Jussieu described it for the first time in 1830.

3. In the same memoir, p. 583, Inc. speaks of an *Oak* (of Shantung province it seems) which he means to be identical with *Quercus orientalis castaneae folio, glande recondita in capsula crassa et squamosa*, which he had seen cultivated in Paris and in Toulouse. Lamarck *Enc. Bot.* I 719, refers this



diagnosis (Tournef.) to a variety of *Quercus aegylops* L. of the Levant. But there can be no doubt that Incarville's Chestnut oak is the ***Quercus chinensis***. Bge., very common in North-China.

4. ***Zanthoxylum Avicennae***. D. C. It was first described by Lamarck l. c. II. 445, in 1786, under the name of *Fagara Avicennae*, from a specimen sent by Incarville, probably from the province of Shantung. It seems this is his *Fagara* or *Poivrier de Chine*, the leaves of which are used to feed a kind of silkworm. (see the above mentioned memoir.)

5. ***Syringa villosa*** first described by Vahl 1805, from specimens gathered by Incarv. in the mountains of Peking.

6. ***Incarvillea sinensis***, described by A. L. Jussieu in 1789. Lam. l. c. III. 243.

7. ***Dicentra spectabilis*** Miq. *Fumaria spectabilis*. L.—Lam. l. c. II. 571, saw dried specimens of this plant sent by Incarv. in Jussieu's herbarium. (comp. also above Linn. Chin. pl. 4.)

8. ***Polygonum tinctorium***. Lour. Grosier (la Chine III. 276) reports that Inc. had sent to Paris seeds of the *Peking Indigo* (which is *Pol. tinctorium*.) accompanied with a memoir on the cultivation of the plant and directions for the extraction of its coloring matter. Jussieu cultivated the plant in the Royal Garden.

9. ***Callistephus chinensis***. Nees. *Aster chinensis*. L. Thounin (Diction. d'Agriculture l. 710.)\* states that seeds of the "Reine Marguerite" sent by Incarv. to Jussieu had been for the first time received in 1728. There seems to be some misapprehension. Seeds of the Chinese Aster or *Reine Marguerite* may have been sent by Incarville but not in 1728, for he arrived in China only in 1740. Dillenius describes the plant for the first time in his Hort. Eltham. 1732.

There is a strong probability that many other plants of North-China cultivated in European gardens and especially in Paris since the middle of the last century, were first raised from seeds sent by Incarville, although in botanical works his name does not appear in connection with the introduction of these plants. I may mention the following:

10. ***Koelreuteria paniculata***. Laxm. a tree hitherto observed in a wild state only in the neighborhood of Peking. Laxmann, a Russian botanist, described it first in 1772. Nov. Com. Acad. Petrop. XVI. He states that this shrub, the native

\* I have not seen the original but quote from Grosier. l. c. III. 129.

country of which then was unknown, had been cultivated for 20 years in the hot-houses of the bot-garden of St. Petersburg. It had first flowered in 1772. Lam. l.c. VI. 667 (1804) notices the *K. paniculata* as cultivated in Paris, but says nothing about its introduction. In England it was introduced in 1763. I am not aware what plant is intended by *Sapindus Koelreuteria*. Blanco. Fl. Philippin. 289.

11. **Zizyphus chinensis.** Lam. l. c. III. 318 states, that this tree is cultivated in the Royal Garden, Paris, and that it is said to be a native of China. *Z. chinensis*, the same as *Z. vulgaris*. Lam is very common at Peking.

12. **Caragana Chamlagu.** Lam. First described as *Robinia Chamlagu* by l' Héritier, *Stirpes novae*, 1784. p. 161. Ex traditione in horto Parisiensi accepta gignitur in China eamque dicunt *Chamlagu* ubi nomen vulgare Sinarum. I am not prepared to explain this name. *C. Chamlagu* is a common plant in the Peking mountains. It has also been gathered at Ningpo and Shanghai (Fortune, Forbes.)

13. **Gleditschia sinensis.** Lam. l. c. II. 466 (1786) states: cultivated in the Royal garden, Paris; it is said to have been raised from seeds received from China. The tree is common in N. China.

14. **Vitex incisa.** Lam. l. c. II. 612 (1786.) said to be a native of China, cultivated in the Royal garden, Paris. Miller (Fig. Gard. Dict. tab. 274.) states that seeds of this plant had been sent by missionaries from China to Paris. This shrub is very common at Peking and has been observed only in N. China, as far as I can conclude from the quotations in D. C. XI. 684. See above Linn. Chin. pl. 185.

15. **Lycium chinense.** L. Miller in his Gard. Diet (1768) No. 6 states with respect to *L. halimifolium* (*L. chinense*) that Bernh. Jussieu, who had received the seeds of this plant from the missionaries in China, transmitted them to Miller. Lam. l. c. II. 509 says that *L. chinense* is cultivated since a long time in the Royal Garden.

It is generally believed that **Sophora japonica.** L. has been first introduced into our gardens by James Gordon in 1753 (See Acton Hort. Kew. III. 2). But in a letter which I lately received from Mr. J. Decaisne he kindly informs me that *Sophora japonica* was introduced into the Jardin des Plantes by d'Incarville.

During my last stay in St. Petersburg, in 1878, I fell in with a curious memoir by Incarville, an *Alphabetic Catalogue of Peking Plants* and other objects of natural history,

published in the *Memoirs of the Soc. of Naturalists of Moscow*, in 1812. (In French.) In an introductory note it is stated, that the original M. S. of this paper exists in the Archives of the Foreign Office at Moscow and had been communicated to the Society by Mr. Molinofsky, councillor of state. It seems that this catalogue had been drawn up by Incarville at the request of Bernh. Jussieu, his instructor. The Chinese characters accompanying the native names of plants, given in the M. S. have been omitted in the printing. Dr. Fischer, inspector of the botanical garden at Gorenki (subsequently Director of the Bot. Garden St. Petersburg) has supplied some scientific botanical names, for Incarville, besides the Chinese names, gives only old French popular appellations of plants. Even at the time when Incarville's paper was published the Flora of Peking had not yet been investigated by men of science and I venture to believe, that in the herbariums of the Botan. Garden and of the Academy in St. Petersburg, which now are so abundantly provided with plants from North-China, there was then hardly a specimen procured from Peking. Thus Fischer, in commenting on Incarville's accounts merely identifies the old French names of plants with the scientific Latin genus names. Incarville notices about 260 Peking plants or drugs, adds generally the Chinese names and occasionally some particulars regarding the economical uses of these plants. As I am tolerably well acquainted with the Flora of North-China and as I know also the popular names applied by the Chinese to the cultivated and some wild growing plants, I find no difficulty in ascertaining the plants mentioned by Incarville. But it would draw out my paper to an unconscionable length, were I to reproduce Incarville's enumeration and to comment on it.

From some allusions in Incarville's memoir it can be inferred that he used to keep up a correspondence with some of the learned academicians in St. Petersburg. He refers to a letter *Krasheninnikov* had written to him about some seeds received from Peking. His collections destined for Jussieu, Inc. used to intrust to the care of the Russian caravans from Kiakhta (resp. Moscow) which every three years visited Peking. Jussieu seems to have forwarded European plants to Inc. by the same way, for in one instance the latter speaks of some bulbs and seeds sent by Jussieu in 1748, and of the delay in their transmission from Kiakhta by the Russian caravan.

In Koch's *Dendrology*, II. 307. I find a statement, that Adr. Jussieu after his death left a M. S. by Incarville, relating his



voyage to China, and a collection of 4010 Chinese drawings representing plants and animals, which then became the property of the Muséum d'histoire naturelle. Anxious to see these documents I addressed myself personally to Mr. Decaisne, the eminent French botanist and director of that Museum. As they were found not to exist there M. Decaisne was kind enough to inquire about them at some other libraries in Paris, where he supposed they might have been deposited. But all inquiries proved unsuccessful. Koch has probably been mistaken, not, I believe, with respect to the real existence of such manuscripts and drawings, but evidently as to their fate after Jussieu's death.

I go on now to illustrate the labours in the way of botanical researches of another Jesuit missionary of Peking, who followed Incarville's footsteps.

**PIERRE MARTIAL CIBOT** was born in 1727 in Limoges, in France. He came to China in 1759 (thus two years after Incarville's death.) and died in Peking in 1784. He was a prolific author and had a predilection for Botany. There are a considerable number of interesting observations from his pen, relating to Peking plants and their economic uses. All his papers have been printed in the *Mémoires concernant les Chinois* etc., this vast repertory of the scientific labours of the Jesuit Missionaries at Peking in the second half of the 18th cent., issued in 16 vol. from 1776 to 1814. Cibot's articles are found in vol. II. (1777), III (1778), IV (1779), V (1780), VIII (1782), XI (1786). We are of course not to seek for scientific botanical names in Cibot's accounts. He confines himself to good popular descriptions and adds generally the names. The following is the list of the plants spoken of in Cibot's papers, with the modern botanical names and the Chinese characters added.

1. On the *Chinese Cabbage* called *Pe tsai* and its culture. 1. c. IV. 503.

*Brassica chinensis*. L. sin: 白菜 *pai ts'ai*.

2. The *Lien hoa* treated of in vol. III. 437, and XI. 218, is *Nelumbium speciosum*. Willd. sin: 蓮花 *lien hua*

3. A good description of the water plant *Lien kien* or *Ki teou* is found in vol. III 451.

This is *Euryale ferox*. Salisb. sin: 蓮茨 *lien kien* or 雞頭 *ki t'ou* (fowl's head.)

4. The *Lin kio* or Water Chestnut. III. 449, is *Trapa bispinosa*. Roxbg. sin: 菱角 *ling kio*.



5. The true Water Chestnut, *Pitsi* III. 451, is *Eleocharis tuberosa*. Schultes. Sin: 勃薹 *pi t'si*.

6. The *hong hoa* used as a red dye, V. 498, is *Carthamus tinctorius*. L. sin: 紅花 *hung hua*.

7. The *siao lan* from which in Peking a blue dye is obtained, a "Persicaire," as Cibot correctly states, V. 499, is *Polygonum tinctorium*. Lour. sin: 小藍 *siao lan*.

8. Various kinds of *Artemisia* used by the Chinese for preparing their *moxa* and also a sort of tinder

*Artemisia vulgaris* L. (*A. igniaria*. Maxim.) and *Tanacetum chinense*. A. Gray.

9. On the cultivation of Cotton in China. II. 603.

10. Tobacco in China. VIII. 267.

11. The Moutan flower, III. 432, is *Paeonia Moutan* Sims. sin: 牡丹 *mu tan*.

12. The *Kui hoa*, *Matricaire de Chine*, III 455, is the celebrated *Chrysanthemum indicum* L. and *Chr. sinense*. Sab. sin: 菊花 *Kü hua*.

13. The *Mu kin*, XI. 500, is *Hibiscus syriacus*. L. sin: 木槿 *mu kin*.

14. The *Pe ge hong*, III. 480, is *Lagerstroemia indica*. L. sin: 百日紅 *po ji hung*.

15. The *Yu lan*, III. 441, is *Magnolia Yulan*. Desf. sin: 玉蘭 *yü lan*.

16. Under the name of *Ye hiang hoa* Cibot gives a good description, III. 478, of *Pergulatoria odoratissima*. Smith. Sin: 夜香花 *ye hiang hua*.

17. The *Mo li hoa*, III. 446, is *Jasminum Sambac*. L. sin: 茉莉花 *mo li hua*.

18. The *Tsieou hai tang*, III. 443, is *Begonia discolor*. R. Br. sin: 秋海棠 *ts'iu hai tang*.

19. On the Peaches of Peking. XI. 280.

20. On the Apricots of Peking, cultivated and wild. V. 505.

21. On Chinese Chestnuts. III. 484. Cibot states, probably on the authority of ancient Chinese authors, that the Chinese graft the Chestnut tree upon the Walnut tree.

22. Cibot asserts further, that the Chinese graft the Quince tree upon the Orange tree. III. 495.

23. On Chinese Jujubes. III. 482.

24. 25. The *Tcheou tchune* or *Frêne puant*, and the *Hiang tchune* or *Frêne odorant*. II. 598. Cibot gives good descriptions of both trees. *Ailantus glandulosa*. sin: 臭椿 *ch'ou ch'un*.—*Cedrela sinensis*. Adr. Juss. sin: 香椿 *hiang ch'un*.

26. The tree *tsao kia*, XI. 493, is *Gleditschia sinensis*. Lam.

Sin: 皂莢 *ts'ao kia*.

27. The tree *chou kou*, resembling the Mulberry tree and the fibrous bark of which is used for making paper, XI. 295, is *Broussonetia papyrifera*. Vent. sin: 楮 穀 *ch'u ku*.

28. On Chinese Oaks. III. 484.

29. Cibot translates from Emperor Kanghi's memoirs an account of a barkless tree of Mongolia, called *Tcha ke*, furnishing an excellent fuel. IV. 460.—This is the *Haloxylon ammodendron* C. A. Mey, the *dshak modo* of the Mongols.

30. The tree *Lo ye song*, a Fir tree with deciduous leaves, in South-Mongolia, IV. 454, is *Larix dahurica*. Fisch. sin: 落葉松.

31. An interesting memoir on Chinese Bamboos is found II. 623.

32. The *mou chou kouo tse*, a tree on which peculiar Galls are produced, XI. 294, is *Celtis sinensis*. Pers. sin: 木樹果子. *mu shu kuò tsz'*.

33. The *Lin tchi*, *Agaric ramifié*, described in vol. IV. p. 500, with an engraving, is a Chinese Agaric, termed 靈芝 *ling chi* in Peking, not yet examined by botanists.

34. The *Mo kou sin*. IV. 500, accompanied with an engraving. This is the *Clathrus mokusin* Spreng. *Phallus mokusin*. L. A more detailed article on this Fungus, has been published by Cibot in the Mémoires de l'Académie de St. Pétersb. IX (1774) The Chin. characters are 蘑菇 *mo ku sin*.

35. Finally I ought not to omit to mention a treatise written by Cibot on Chinese Hot-houses, in which he furnishes interesting details with respect to the primitive but practical mode of Peking gardeners to protect Southern plants in winter, and how they proceed to cause plants to put forth blossoms in winter. Vol. III. 423.

For the sake of completeness I may mention moreover in connection with papers on botanical matters two Jesuit missionaries of Peking, contemporaries of Cibot. One of them **L. COLLAS**, +1781, wrote an article on Chinese Bamboos, and another on the plants, flowers and trees of China, which could be cultivated in France. Mém. conc. Chin. XI. 553, 183.

**L. de Poirot**, +1802, has written a paper on Chinese Worm wood (*Artemisia*). *ibid.* IX. 244.

Before quitting the subject dealt with in this chapter it may not be out of place to call the attention of the reader to a slight account of Northern Chinese fruits and vegetables found

in **PALLAS'** notable work **REISEN DURCH VERSCH. PROVINZEN DES RUSSISCHEN REICHES**, 1768-1773. In the 3d. volume Pallas details some natural products sold in the streets of the Chinese market town *Maimaicheng*, opposite Kiakhta, which place he visited in 1772. Most of these fruits and vegetables, brought for the greater part from Peking, were completely unknown to him, but he describes them and adds the Chinese or Mongol names. As it may be presumed, that hardly any botanist, not acquainted with the native names of North-China and Mongol names of plants, would be able to ascertain what fruits are enumerated in Pallas' account, I venture to make some brief commentary on it.

Small green Peas, called *lo dou*, which Pallas correctly identifies with *Phaseolus radiatus*. L. See above Linn. Chin. pl. 74.

*Arbuzes*, *Pears*, *Apples*, called *pinsa* and resembling green Rennet apples.

Watermelons (*Arbuz* in Russian) are cultivated in Transbaicalia, but no edible pears or apples are grown in Southern Siberia. 蘋果 *p'in tsz'* in Peking is a small dark-red Apple.

Oblong *Quinces*, called *mugha*.

*Cydonia sinensis*. Thouin. Sin: 木瓜 *mu kua*. The fruits of this are brought to Peking from the province of Shantung. They are oblong and often of enormous size.

*Lemons*, sweet and acid *Oranges*, *Walnuts*, *Chestnuts*, called *lidsa*.

*Castanea vesca* 栗子 *li tsz'*.

Small red *Medlars*, *Mespilus fructu obtuse pentagono, ruberrimo*. These are said to grow wild in North-China. The Chinese boil them with sugar and thus make a kind of Jam.

An excellent Jam is prepared in Peking from the fruit of *Crataegus pinnatifida*. Bge.

The fruit *Alema* is the fruit of the tree *Akashu*, an Apple tree of Southern-China.

*Alema* is the Mongol name for Apple. It seems that the other name is a corruption of 沙果树 *sha kuo shu*, Apple tree. *Sha kuo* at Peking is a small red-cheeked Apple.

Pallas saw also a most curious kind of *Citron*, splitting into 12 fingerlike divisions. It is devoid of pulp and seeds, but is very fragrant. The Chinese called it *Fui shu*.

*Citrus Chirocarpa*. Lour. Fl. coch. 568. Sin: 佛手 *fo shou*.

Small fruit of a kind of *Elaeagnus* with a peculiar stone. The Bukhars call it *dshigde*, the Mongols *zagda*, the Chinese *sazusa*.

The fruit Pallas saw was probably that of *Elaeagnus hortensis* M. B. var. *songarica* or the var. *orientalis*, (D. C. XIV. 609.) The Kirghizes call the *Elaeagnus* fruit *dshigde*, the Chinese 沙枣 *sha tsao*. (Sand Jujube, name applied in Peking to *E. latifolia*. L.)

Smoke dried red Plums, *shuptaga*, with roundish stones.

*Shuptaga* is the Mongol name for Jujubes. *Zizyphus chinensis*. Lam. has small fruits with roundish stones. The Chinese use to dry them.

Black sweetish fruit with many flat seeds, called *hodsoi*.

Probably *Diospyros Lotus*. L. Sin: 黑枣 *hei tsao*.)

Pallas states that the same fruit is brought to Kiakhta from Persia, and called *sorokum*.

Pallas describes also the fruit *lun yen* (*Nephelium Longan*).

He saw further some leguminous fruit, each containing two seeds, resembling in taste those of the tree *Arabis curasavica* (?)

Probably *Arachis hypogaea*. L.

White nuts with a smooth shell like the stone of the Apricot and of a bitter taste. They call them *lanziu* or *boigo*.

*Salisburia adiantifolia*. Smith. 白果 *pai kuo* in Peking.

Long dried flowers, called *tchetcheng*, brought from the South. The Chinese boil and eat them.

*Hemerocallis fulva*. L. and other species. Sin: 金銀花 *kin cheng hua*. The flowers are a favorite vegetable of the Chinese. In Mongol *shira tsitsik*.

Long articulated spongy roots of a water plant. This was I think the root of *Nelumbium speciosum* Willd. from which the Chinese prepare a kind of Arrow root.

#### V. SONNERAT.

About a quarter of a century after Osbeck had herborized in the neighborhood of Canton, China was visited by a French naturalist, who gathered some plants at the same place it seems. **P. SONNERAT** was born in 1745 and spent a great part of his life, from 1768-1803, in travelling to different distant countries of the old and the new world. In 1768 he went to Isle de France, visited with Commerson Madagascar and Bourbon. From 1774 to 1781 he travelled to China and India, and settled finally at Pondicherry. In 1803 he returned to France with an immense collection. He died in 1814. Lamarck in his Enc. Botan. has described a great number of Sonnerat's specimens.

There is a work entitled: *Voyage aux Indes Orientales et à la Chine 1774-1781 par M. Sonnerat, Commissaire de la marine, naturaliste du Roy. 1782. 2 vol.*



All that I can gather with respect to Sonnerat's voyage to China is on the title of this book. The text contains no allusion to his journey but consists of several articles on the countries he visited and the natural objects he collected there. It may be assumed however, that Canton was the place he visited in China. In the 2d volume p. 222-248 we find descriptions of plants with good engravings. Only 3 Chinese plants are there represented, viz:

*Litchi chinensis*. p. 230. tab. 129. *Nephelium Litchi*. Camb.

*Cookia punctata*. p. 231. tab. 130. *Clausena Wampi*. Oliv. Fl. hgk. 50.

*Marsana burijolia*, Buis de Chine. p. 245. tab. 139. *Murraya exotica*. L. Fl. hgk. 50.

Besides this Lamarck noticed some plants gathered by Sonnerat in China. I name those which I have happened to find mentioned.

*Uvaria odorata*. Lam. I. 595. *Unona odorata* Dunal. *Alanguilan* de la Chine. Sonnerat.

*Melastoma repens*. Lam. IV. 54. Flor. hgk. 113.

*Leora chinensis*. Lam. III. 344.

*Capsicum sinense*. Lam. V. 327.

*Bignonia chinensis*. Lam. I. 423. *Tecoma grandiflora* Del.

*Phyllanthus lucens*. Lam. (Poir.) V. 296. *Andrachne fruticosa*. L. Fl. hgk. 313.

*Phyllanthus villosus*. Lam. (Poir.) V. 297.

*Adiantum flabellatum*. Lam. I. 42. Flor. hongk. 447.

*Pteris crenata*. Lam. (Poir.) V. 715. Fl. hgk. 448.

## VI. LOUREIRO.

We come now to the most conspicuous among the Jesuit missionaries, who have devoted themselves to the investigation of Chinese botany. I shall attempt presently to give an account of **LOUREIRO'S FLORA COCHINCHINENSIS**, a valuable monument of conscientious labour and considerable research. Although it deals properly, as the title intimates, with the Flora of CochinChina, there are also described in it a considerable number of Chinese plants.

Let me introduce the subject with a short biographical notice derived principally from the preface to the book, written by the author himself. I have also consulted Colmeiro's History of Botany in Spain and Portugal 1858. (in Spanish.)

Ioannis de Loureiro was a Portuguese. According to Colmeiro he was born in 1715 and proceeded in 1735 as a missionary to CochinChina. But from Loureiro's own account we infer

that he arrived in Cochinchina about 1743, for he says that when in 1779 he established himself in Canton, he had spent 36 years in Cochinchina. As he states, p. 818, that in 1742 he was in Cambodja, we can therefore infer that he first lived in that country. It seems, that after his arrival in Cochinchina he had soon gained influence, for we find him holding an office at the Court of the King. (Rebus mathematicis ac physicis in Aula praefectus). Some knowledge of medical practice which he had previously acquired rendered him very popular among the people. He tells us that, European medicines not being within his reach, he was obliged to depend entirely on native drugs, and by investigating them he was necessarily induced to study the flora of the country and to make botanical collections. This was the origin of his herbarium. His collection of plants of Cochinchina (nearly 1000 species) seems to be confined for the greater part to a small area of the littoral region. He says, that his herbarium is far from being complete and may represent only about a quarter of the flora of Cochinchina. It had been impossible for him to procure plants from the distant forests. Only a few specimens had been obtained with great pains and not without danger from the (neighboring) forest-covered mountains. As at the time of Loureiro the capital of Cochinchina, where he lived, was at *Huê* (near the sea coast, about 17° N.L.) it may be assumed, that the largest part of his Cochinchinese specimens were gathered in the neighborhood of that place. He generally does not specify the stations of the plants he collected in Cochinchina but confines himself to the statement that they are natives of that country. It is only in a few cases, which I shall notice here, that he refers to the stations.

*Huac*, the metropolis of Cochinchina, is only once mentioned p. 129.

The port of *Eo* near *Huac*, ibidem.

The rivulet *Hon mo*, not far from *Huac*, p. 32.

The mountain of *Ho chen* opposite *Huac*, p. 201.

The mountain of *Con mit* situated at a distance of 6 miles from *Huac*, p. 753.

The port of *Turan*, called *Han* by the natives, south of *Huac*, p. 208.

Province of *Doung nai* in the Southern part of Cochinchina, 10°. N.L. p. 109.

Province of *Binh khang* in the southern part of Cochinchina, 14°. N.L. belonging in former times to Champava. p. 154. 283.

Province of *Quang binh* in North-Cochinchina. p. 404.

Via (province?) *Nha ho* in North-Cochinchina. p. 544.

The country of the *Moji* (tribe) in the west, p. 679.

Mountain *Nguon nhung* (Cochinchina) p. 646.

Sandhills of *Son koung* (Cochinchina) p. 248. 547.

River *Lavus* flowing between Cochinchina and Laos: p. 327.

In 1779 Loureiro proceeded to *Canton*, where he continued his botanical researches during three years. As at that time foreigners living in Canton were not allowed to walk beyond the limits of the factories, L. hired a Chinese peasant, acquainted to a certain degree with the medicinal plants of the country, to collect such for him. This Chinaman used to communicate also the native names of the plants he brought in the vernacular Cantonese dialect. But as the information thus derived seemed not always to be reliable, L. compared it with a Chinese book on Botany, in which he was able to find the correct names of the plants used for medical and economic purposes, and in his *Flora cochinchinensis* tried to spell these names according to the Mandarin dialect.

Loureiro seems to have embarked with his botanical treasures in 1782. On his way home he visited the island of Mozambique, where he made a stay of three months, enriching his herbarium with many rare specimens. He states further, that during his peregrinations he had improved the opportunity by herborizing in Cambodja, Champava, Bengal, Malabar, Sumatra. All the plants gathered in those regions he describes also in the *Fl. cochin.*

After having reached his native country L. was taken up during several years, in Lisbon, with the preparation of his work for publication. In 1788 the M.S. of the *Flora coch.* written in Latin, and arranged according to the Linnaean system, was completed, but the book was not brought out before 1789. Three years later Willdenow edited it anew, adding some notes, which however throw little light on dubious questions and as he had no opportunity of referring to Loureiro's herbarium his identifications are not always happy.\* In the following notes, quoting Loureiro, I always refer to Willd. edition.

According to the *Catal. Patr. Jes. Sin.* Loureiro died in 1794. But Colmeiro makes him die two years later.

There is no allusion in L.'s preface to his having belonged to the Soc. of the Jesuits. On the title page he styles himself only: *olim in Cochinchina Catholicae Fidei praeco.* But in

\* On p. 458 he identifies Loureiro's *Campsis adrepens* with *Incarvillea sinensis*. But the former is *Bignonia grandiflora* and bears no resemblance to *Incarvillea*.

the *Catalogus* he is stated to have entered the Jesuit mission in China in 1779.

Loureiro occupies without doubt one of the most prominent places among the botanical collectors of the last century. We owe to him one of the most important contributions illustrating the Flora of the eastern part of the transgangetic peninsula and of South-China, and his book is still a standard work to which botanists dealing with Chinese plants have frequently to refer. Although a self-taught and not professional botanist, L. had acquired good botanical knowledge, at least he was up to the level of his time. Modern botanists often find fault with his description of plants. But may we not ask whether it would be possible to identify even a quarter of Linnaeus' plants only from the short characters he gives, had his herbarium been lost, as is the case with the greater part of Loureiro's collection. Thus Loureiro is not to be blamed for want of scientific accuracy in our modern sense or for mistakes occasionally met with in his work. Generally it can be said, that he was a conscientious observer and his veracity is always beyond question.

One great merit of the *Flora cochin.* consists in descriptions made by a botanist upon living or fresh plants. It is a matter of regret, that the greater part of the existing Floras of various exotic regions have necessarily been based upon the description of dried specimens and often unsatisfactory material. The botanist in Europe, who works up these collections then knows nothing more about the plants he has to describe than he observes on the dry specimens. Thus it is quite exceptional to find in De Candolle's *Prodr.* the colour of the blossoms noticed, although this is a very important characteristic.

The value of Loureiro's elaborate work lies also in the illustrations he gives with respect to the economical use, medical virtues etc. of the plants. The Chinese names he adds are for the greater part correct.\* He gives them

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\* I take the opportunity of noticing here a very valuable list of Canton plants with the Chinese names added, and accompanied with interesting annotations, published two years ago in the *Hongkong China Mail*, July 10 to Spt. 11. 1878. The anonymous author of this paper, which gives the Chinese, (Cantonese) names of nearly 300 plants, states, that in compiling this list he did not refer to any printed authority for the application of any one Cantonese name to any single botanical name. But every plant had been shown to at least three natives to ascertain the Chinese names and then referred to a competent botanical authority, to supply the scientific name. This is indeed the only rational way to identify Chinese appellations of plants. I have been informed, that Mr. E. H.



now in the Mandarin, now in the popular Canton dialect and makes sometimes mistakes in transliterating the characters.

A considerable number of plants described by Loureiro, especially of Southern Chinese ones have been gathered by later collectors, who investigated the Floras of Canton, Macao or Hongkong. Loureiro's name occurs frequently in *Hooker* and *Arnott*, Botany of Capt. *Beechey's* voyage—in *Meyen's* Observ. botan. in it. c. terram.—in *Bentham's Flora hongkongensis*. Dr. Hance has also rediscovered many Loureirian specimens. But a great part of Loureiro's plants, in particular those from Cochinchina are still known only from his description, although they are probably very common in that country. It may be also that many Loureirian species relegated by botanists among the species dubiae are known under other scientific names. From the diagnoses alone given by L., without examining the original specimens, it is impossible to identify them.

I may say finally a few words with respect to the fate of Loureiro's herbarium. From his preface we learn, that in 1774, when he was still in Cochinchina, he had sent by way of Canton to England and Sweden about 60 specimens of plants, accompanied with his own original descriptions, and that Berg in his *Materia med.* p. 5 and *Linnaeus fil.* Suppl. p. 331, have noticed these plants. In 1779, when he was already established in Canton he transmitted to London 230 species more, which seemed to him to be novelties. This collection is now in the British Museum. As we can conclude from some references found in *Benth.* and *Hook.* Gen. Plant. these plants have been badly preserved and their examination is of little use for deciding dubious questions. According to Colmeiro the bulk of Loureiro's herbarium was

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*Parker* of the British Cons. Serv. at Canton is the author of this paper, and I need hardly say, that the competent botanical author alluded to in it, is my respected friend Dr. *H. F. Hance*. I hope these gentlemen will pardon my having disclosed their names. The only faults I have to find with Mr. *Parker's* paper, are its publication in a Newspaper, where hardly any one interested in these questions would dream of looking for it, and the arrangement of the list in no intelligible order, scattered over 8 numbers of the *China Mail* with the interesting annotations generally not placed in the same number as the plants to which they refer. It would be worth reprinting in a form more accessible for reference.—M. *Parker* is right in supposing that a great part of the Chinese names of plants, given by Dr. *Williams* (*Bridgman's Chrestomathy*) have been derived from Loureiro.

kept by the Academy of Lisbon, but in 1808, when Napoleon I. had taken possession of Portugal a part of the herbarium was transferred to Paris, where it still exists in the Muséum d'hist. nat. as Mr. Decaisne has kindly informed me. My late friend Mr. D. Hanbury gives the following account with respect to Loureiro's herbarium. (Science Papers 98) M. Pereira Da Costa of Lisbon had informed him, that the herbarium in question had never been at the Academy; it was supposed to have formerly belonged to the Museu da Ajuda; but upon the removal of that establishment to the Academy, no trace of it could be discovered.

A great number of new plants have been described by Loureiro. Among the new *Genera* he has proposed, the following 30 have been ascertained and retained in Bentham and Hooker's (or Endlicher's) *Genera Plantarum*.

Aerides.	Dichroa.	Osmanthus.
Aglaja.	Enhydra.	Phajus.
Argyreia.	Enkianthus.	Rhynchosia.
Baccaurea.	Fibraurea.	Salomonina.
Blastus.	Grona.	Sarcodium.
Bragantia.	Helicia.	Stephania.
Centipeda.	Homonoia.	Streblus.
Coleus.	Limacia.	Striga.
Cyathula.	Mallotus.	Trema.
Derris.	Mazus.	Triphasia.

The total number of plants described in Loureiro's *Flora Cochinchin.* is 1257 of which 36 must be deducted as having been gathered in India, Sumatra, Mozambique. Of the remaining 1221 he enumerates 976 for Cochinchina and of these, 294 he had also gathered in China. As found only in China he mentions 245 spec. Thus the total number of Chinese plants observed by Lour. is 539. Of 341 of these China in general is given as habitat. With respect to the rest he indicates the habitat precisely, viz.

Canton and Macao 193 plants.

Southern China in general 2.

Province of Yunnan 1. *Anomum medium*. p. 5.

Mountains of West-China 1. *Nardus indica*. p. 57.

North-China 15 species. These plants or accounts of them had probably been sent to Loureiro from Peking by the Jesuits there (Incarville? Cibot?)

*Dorstenia chinensis*. p. 114.  
*Rhamnus saporifer*. p. 196.  
*Rheum palmatum*. p. 314.  
*Pyrus Malus*. p. 393.  
*Pyrus Cydonia*. p. 394.  
*Potentilla fruticosa*. p. 399.  
*Sinapis pekinensis*. p. 485.  
*Glycyrrhiza echinata*. p. 543.  
*Robinia flava*. p. 556.  
*Cichorium Endivia*. p. 583.  
*Artemisia annua* (Peking.) p. 599.  
*Tussilago Farfara*. p. 614.  
*Tussilago Anandria*. p. 614.  
*Paeonia officinalis*. p. 419.  
*Juglans regia*. p. 702.

CHINESE PLANTS DESCRIBED IN LOUREIRO'S FLORA  
 COCHINCHINENSIS.

In what follows I shall give a list of all the plants Loureiro mentions for China and include also those species which he had gathered only in Cochinchina but which subsequently have been observed also in China.

I arrange the list according to the Natural System adopted by Bentham and Hooker, giving for each plant at first the Loureirian name, the habitat and the Chinese name as noticed by Loureiro, and quoting the page in the *Flora cochin*. After this I shall add, if necessary, my observations. Many of Loureiro's plants have by the progress of science received other names and mistakes made by that author have been occasionally corrected. In my researches with respect to Loureirian plants I depend upon *De Candolle's Prodrromus*, *Kunth's Enumeratio plantarum*, *Bentham and Hooker's Genera Plantarum*, *Bentham's Flora hongkongensis*, the botanical papers published by *Maximowicz*, *Dr. Hance* and others. I shall also give the Chinese names of plants noticed by Loureiro, as far as I have been able to ascertain them.

With respect to the abbreviations used in the following notes I beg to refer to my list of Chinese plants known to Linnaeus. When quoting Osbeck I always refer to that list not to Osbeck's Voyage.

DICOTYLEDONS.

1. ***Clematis minor***. Lour. Canton. Sin: *uei leng sien* (威靈仙). 422.

*Cl. terniflora*. D. C. Maxim. Dec. XX. *Cl. ternifolia*. Fl. hbk. 7. *Cl. chinensis*. Retz. (?) Osb. 1.

2. **Clematis sinensis**. Lour. China. Sin: *mu tum* (木通). 422.

Willdenow thinks, that it is the same as *Cl. chinensis*. Retz. Osb. 1.

3. *Clematis virginiana*. Lour. (non Linn.) Cochin-China. 422.

**Clem. apiifolia**. D. C.—Maxim. Dec. XX. Amoy, N. China (Fortune).

4. **Thalictrum sinense**. Lour. China. Sin: *poi mu* (貝母). 423.

D. C. I. 16. *Planta dubia*.

5. *Hecatonia palustris*. Lour. Sin: *chu lien*. Canton. 371.

D. C. I. 34. **Ranunculus sceleratus**. Linn.—Hce. add. Fl. hgk. 98.

6. *Hecatonia pilosa*. Lour. Canton. Sin: *Khao tsao*. 371.

D. C. I. 43. **Ranunculus cantoniensis**. Not observed after Lour.

7. *Paeonia officinalis*. L. China borealis. Culta per tot. imp. Sinense. Sin: *xo yo* (芍藥). 419.

The above Chinese name is applied in China to *P. albiflora*. Pall.

8. *Calligonum asperum*. Lour. Cochin. 418.

D. C. I. 70. *Trachytella Calligonum*.—*Delima sarmentosa*. Linn. Fl. hgk. 7. G. Pl. I. 12.—**Tetracera sarmentosa**. Willd. Hce. Add. Fl. hgk. 99.

9. *Actaea aspera*. Lour. Canton. Sin: *tsia ip* (錫葉). 405.

D. C. I. 70. *Trachytella Actaea*.—G. Pl. I. 12. spec. valde dubia.—Bridgm. Chrest. 457 (3).

10. **Illicium anisatum**. L. Provinciae ad occasum Canton. Sin: *pa co huei hiam* (八角回香). 432.

Comp. above Linn. Chin. pl. 2.

11. *Liriodendron Coco*. Lour. Macao, Canton, Cochin. culta. 424.

Hance Advers. in stirp. crit. 6. **Magnolia pumila**. Andr.—Fl. hgk. 8.

12. *Liriodendron liliifera*. Linn. Canton. Lour. 424.

D. C. I. 81. **Magnolia inodora**. Not observed after Lour. Comp. also Trim. Journ. bot. IV. 225. *Liriodendron* in China.

13. *Liriodendron Figo*. Macao, Canton, cult. 424.

Hance Advers. 6. **Michelia** (**Magnolia** Andr.) *fuscata*.

14. **Michelia Champaca**. Linn. Macao, Coch. cult. Lour. 425.

15. *Uvaria uncata*. Lour. Canton. Sin: *yin chao* (鷹爪). 426.

The above Chin. name is applied in Canton to *Artabotrys odoratissima*. R. Br. (Parker.)—Fl. hgk. 10.

16. *Desmos chinensis*. Lour. Canton. Sin: *cau tsit fung*. 431.

D. C. I. 91. **Unona chinensis**. Species non satis nota.

17. **Anona squamosa**. Linn. China, Coch. cult. Sin: *pu non* (木瓜). Lour. 427.

As is known this is a native of tropical America. The name Lour. gives as a Chinese appellation is the Malay name of the fruit, being *buwa nona* (Cyclop. of India.)



18. **Fibraurea tinctoria.** Lour. Sin: *tien sien tan* (天仙藤?). China, Coch. 769.

G. Pl. I. 39. *Planta imperfecte nota.*

19. **Nymphaea Nelumbo.** Linn. Sin: *lien hoa* (蓮花). China, Coch. Lour. 416.

D. C. I. 113. **Nelumbium speciosum.** Willd.—Osb. 3—Fl. hgk. 15.

20. **Chelidonium majus.** Linn. China, Sin: *hoam lien* (黃蓮). Lour. 402.

*Chel. majus* is common in North-China. D. C. I. 123. means that Lour.'s plant is a new species: *Ch. sinense*.

21. **Lepidium petraeum.** Linn. China, Sin: *tim li* (葶藶). Lour. 479.

D. C. I. 236. **Nasturtium. ? chinense** (Lour.'s plant). Not observed in China after Lour.

22. **Cardamine Chelidonia.** Linn. Canton. Lour. 484.

D. C. I. 152. European plant, not observed in China, after Lour.

23. **Ricotia cantoniensis.** Lour. Canton. 482.

D. C. I. 157. *Dubia.*

24. **Brassica oleracea.** Linn. China, Coch. cult. Lour. 481.

25. **Brassica chinensis.** Linn. Sin: *chai lan ts'ai* (芥藍菜). Cult. China, Coch. Lour. 482.

Osb. 5. The above Chin. name given by Lour. is found in the Kuang tung tung chi. (vegetables).

26. **Sinapis chinensis.** Linn. Sin: *kiai ts'ai* (芥菜). Cult. China, Coch. Lour. 485, means, that it is only a variety of *S. juncea*. L.

Linn.-Chin. pl. 8. In Peking different varieties of *S. juncea*. L. go under the above Chinese name.

27. **Sinapis pekinensis.** Lour. Sin: *pe ts'ai*. (白菜). Peking. cult. 485.

In Peking this Chin. name is applied to *Brassica chinensis*.

28. **Sinapis brassicata.** Linn. Sin: *pe kai*. (白芥). China, Coch. cult. Lour. 485.

Linn. Chin. pl. 10.—D. C. I. 219.

29. **Thlaspi bursa pastoris.** Linn. China. Lour. 480.

D. C. I. 177. **Capsella bursa past.** Moench.—Fl. hgk. 14. Frequent in N. China.

30. **Raphanus sativus.** Linn. Cult. China, Coch. Sin: *tsai fu ken* (菜菔根) or *la bac* (蘿蔔).—Lour. 481.

Flor. hgk. 17.—Cultivated throughout China.

31. **Cleome icósandra.** Linn. Coch. Lour. 483.

D. C. I. 242. **Polanisia viscosa.**—Fl. hgk. 18.

32. **Capparis cantoniensis.** Lour. Canton. Sin: *hiang lac phung*. 404.

D. C. I. 253. Spec. dubia.

33. **Capparis falcata.** Lour. Canton. 405.

D. C. I. 243. **Crataeva falcata.** Not observed after Lour.

34. **Reseda chinensis.** Lour. Sin: *thin ki hoam*. Canton. 367.

Not observed after Lour.

35. **Viola primulaefolia.** Linn. Canton. Lour. 628.

D. C. I. 293. **Viola Patrini** var. **chinensis.** (Lour.'s plant.) Fl. hongk. 20.

36. **Viola odorata.** Linn. Canton. Sin: *kiet tuong hoa*. Lour. 627.

Maxim. identifies Lour.'s plant with **V. serpens.** Wall. Fl. hgk. 20. *V. confusa*

37. **Phoberos chinensis.** Lour. China. Sin: *Có tsu*. 389.

Flora hongk. 19. **Scélopia chinensis.** Clos.

38. **Salomonina cantoniensis.** Lour. Sin: *siao lam teng*. Canton. 18.

D. C. I. 334. Specimen in hb. Mus. Paris. Fl. hgk. 44.

39. **Polygala sibirica.** Linn. Canton. Lour. 517.

Frequent in North-China.

40. **Polygala glomerata.** Lour. Canton. Sin: *tai kam* (大金 Parker). 518.

D. C. I. 326. specim. in Mus. Paris.—Fl. hgk. 44.

41. **Dianthus caryophyllus.** Linn. China, colitur. Lour. 345.

Probably another species.

42. **Dianthus chinensis.** Linn. China, Coch. cult. Lour. 346.

Lin. Chin. pl. 14.

43. **Hedona sinensis.** Lour. Canton. Sin: *yu mi*. 351.

According to Willdenow this is **Lychnis grandiflora.** Jacq.—Bridgm. Chrest. 454 (66.) **Lychnis coronata**, Sin: 虞美人 *ü mi yan*.

44. **Cerastium repens.** Linn. Canton, Coch. Sin: *a kim tsao*. Lour. 349.

D. C. I. 419. **Cerastium arvense.** L. ?—The latter plant occurs in North-China.

45. **Portulacca oleracea.** Linn. Sin: *ma chi hien* (馬齒莧) China, Coch. Lour. 359.

Fl. hgk. 327.

46. **Tamarix chinensis.** Lour. Provincia Canton. Sin: *cuon nham lau* (觀音柳). 228.

Hook. et Arn. voy. Beech. 186. South-China. Frequent in N. China.

47. *Hypericum aureum*. Lour. Canton, spont. et cult. Sin: *quei thoung hoa* 578. Lour. says: suspicio hoc esse *H. monogynum* Thbg.

Hook. et Arn. voy. Beech. 172. *H. chinense*. Mill. S. China.—Linn. Chin. pl. 15.—Sin: 金絲海棠花 *kin sze hai tang hua* (Parker.)

48. *Hypericum olympicum*. Linn? Canton, Cochin. Sin: *hoang xoc*. Lour. 577.

49. *Hypericum petiolatum* Linn. Sin: *hoang nieu than* (黃牛頭). Canton. Lour. 577.

Linn.'s plant is a dubious species. D. C. I. 543. *Vismia? petiolata*. Brasilia.

50. *Cambogia Gutta*. Linn. Sin: *hoam lo* (黃檀?). Cochin. Siam, Cambodja. Lour. 406.

D. C. I. 561. *Garcinia Cambodja*. Desr.—According to Hanbury (Science pap. 329.) the Gamboge of Siam and Singapore is yielded by *Garcinia Morella*.

51. *Thea cantoniensis*. Lour. Sin: *Ho nam cha yong* (河南茶). Canton. 414.

D. C. I. 530. *Thea chinensis*, var. *Bohea*. L. In the Chinese name given by Lour. *Ho nam* means probably the island of this name on which a suburb of Canton is situated.

52. *Thea cochinchinensis*. Lour. Cochin. boreal. 413.

53. *Thea oleosa*. Lour. Sin: *yeu cha* (油茶). Canton 414.

Not observed after Lour.—Not to be confounded with *Thea oleifera*. Abel, which according to Hance is *Camellia Sasanqua*. Thb.

54. *Camellia drupifera*. Lour. Cochin. Oleum ex nucleis expressum aestimatur ab indigenis. 499.

D. C. I. 529. Dubia.

55. *Malva verticillata*. Linn. Canton, Coch. rara. Sin: *tung quei tsu* (冬蔡子). 514.

Comp. Linn. Chin. pl. 20.

56. *Sida cordifolia*. Linn. Cochin. Lour. 503.

Fl. hgk. 33.

57. *Sida scoparia*. Lour. Cochin. 504.

D. C. I. 460. *Sida acuta*. Burm. Fl. hgk. 32.

58. *Urena polyflora*. Lour. Canton. Sin: *xie than fo*. 508.

D. C. I. 441. *Malachra Urena*. Dubia.

59. *Urena procumbens*. Linn. China, Coch. Lour. 507.

Osb. 24.

60. *Urena sinuata*. Linn. Cochin. Lour. 507.

Flor. hgk. 34.

61. **Urena lobata**. Linn. China, Coch. Sin: *sie thau fo* (see 58). Lour. 507.

Osb. 23.—Fl. hgk. 34.

62. **Hibiscus syriacus**. Linn. Coch. In China non visus. Lour. 511.

Journ. Bot. 1879. 9. Hance. Canton prov.—Frequently cultivated in China.

63. **Hibiscus mutabilis**. Linn. China. Coch. cult. Sin: *fu yung* (芙蓉). Lour. 511.

Osb. 25.—Journ. Bot. 1879. 9. Hance. Canton prov.

64. **Hibiscus Rosa sinensis**. Linn. China. Coch. cult. spont. Lour. 510.

D. C. I. 448, gives only India as native country. I know that it is much cultivated in South-China.

65. **Hibiscus esculentus**. Linn. China, Coch. cult. Sin: *hoang souc quei* (黃蜀葵). Lour. 512.

D. C. I. 450. India orient. cult.

66. **Hibiscus tiliaceus**. Linn. China, Coch. Lour. 509. Fl. hgk. 35.

67. **Gossypium herbaceum**. Linn. Cult. China, Coch. Sin: *mien fu* (棉花). Lour. 505.

Osb. 27.

68. *Bombax pentandrum*. Linn. China, Coch. Sin: *mo mien hoa* (木棉花), *uen xu*. Lour. 504.

D. C. I. 479. *Eriodendron anfractuosum*. India orientalis.—The tree is well known to the Chinese.

69. *Helicteres undulata*. Lour. Coch. 649.

Spreng. Syst. III. 81. *Sterculia lanceolata*. Cav.—Fl. hgk. 36.

70. **Helicteres angustifolia**. Lour. Canton. Sin: *san chi ma* (山芝麻). 647.

Osb. 29.—Fl. hgk. 37.—Parker, the same Chin. name as Lour.

71. **Pentapetes phoenicea**. Linn. Cult. China, Coch. Lour. 497.

D. C. I. 498. India orient.—Cultivated Canton (Williams).

72. *Fallopia nervosa*. Lour. Canton. Sin: *hai pu ip*. (薛寶葉 Williams). 410.

Hance, Journ. Bot. IX. 239. *Grewia microcos*. Linn. known to Linn. from Ceylon.—Fl. hgk. 42.

73. *Arsis rugosa*. Lour. Coch. 409.

G. Pl. I. 233. *Grewia rugosa*.—Hook. et Arn. bot. Beech. 170

74. **Corchorus capsularis**. Linn. Canton, agrest. cult. Sin: *san lim ma*. 408.

Fl. hgk. 40.



75. **Oxalis corniculata**. Linn. China, Cochin. Sin: *tso tsian tsao* (酢漿草). Lour. 350.

Osb. 32.—Fl. hgk. 56.

76. **Oxalis sensitiva**. Linn. Canton, Cochin. Sin: *chan tsu*. Lour. 350.

D. C. I. 690. **Biophytum sensitivum**. Ind. orient.—Not observed in China after Lour.

77. **Averrhoa Carambola**. Linn. China austr. Cochin. Sin: *yam tao* (楊桃). Lour. 354.

Osb. 33.—Fl. hgk. 56.

78. **Impatiens Balsamine**. Linn. Cochin. agrest. cult. Lour. 626.

Osb. 34.—Much cultivated throughout China.

79. **Impatiens chinensis**. Linn. Canton, cult. spont. Sin: *hum thau kio*. Lour. 625.

Osb. 35.

80. **Impatiens mutila**. Lour. China, Cochin. cult. 627.

81. **Impatiens cochleata**. Lour. Canton. cult. Sin: *tsien chi hum*. 686.

82. **Tribulus terrestris**. Linn. China, Cochin. Sin: *cie li tsu* (蒺藜子). Lour. 331.

Very common in North-China. Has been gathered also in Formosa.

83. **Ruta chalepensis**. Linn. China, Cochin. cult. Sin: *sao tsao*. Lour. 330.

D. C. I. 710. **R. bracteata**. According to Parker, list of Canton plants, the Chinese call it 臭草 *ch'ou ts'ao*.

84. **Lepta triphylla**. Lour. Cochin. 104.

Flora hgk. 59. **Evodia Lamareckiana**. Bth.

85. **Fagara piperita**. Linn. Cochin. Lour. 101.

Fl. hgk. 58. **Zanthoxylum nitidum**. D. C. I. 727.

86. **Piper pinnatum**. Lour. China. Sin: *xu tsiao* (蜀椒). 38.

D. C. XVI. 1. 383. *ignotum*.—Judging from the Chin. name it seems to be a **Zanthoxylum**.

87. **Zanthoxylum clava Herculis**. Linn. China, Cochin. Sin: *so*. Lour. 810.

D. C. I. 727. American species.

88. **Jambolifera pedunculata**. Linn. Macao. Lour. 283.

Benth. et Hook. G. Pl. I. 302. **Acronychia Cyminosma**.—*Cyminosma pedunculata*. D. C. I. 722.—Fl. hgk. 59.—Loureiro's *Jamb. resinosa* 285 is the same.

89. **Triphasia aurantiola**. Lour. China, Cochin. cult. 189, 572.

G. Pl. I. 303. Species *chinensis*, **Limonia trifoliata**. Linn. Known to Linn. from India.

90. *Chalcas paniculata*. Linn. China, Cochin. Sin: *cao li yong* (九里香). Lour. 331.

D. C. I. 537. *Murraya paniculata*. Ind. orient.

91. *Chalcas japonensis*. Lour. China, Cochin. 332.

D. C. I. 537. *Murraya exotica*. L. India. Flor. hgk. 50. According to Parker the Chin. name given by Lour. for *Ch. paniculata*, is applied to *Murraya exotica*.

92. *Quinaria lansium*. Lour. Canton, cult. Sin: *uan pi chu* (黃皮樹). 334.

D. C. I. 536. *Cookia punctata*. Retz.—G. Pl. I. 304. *Clausena Whampii* Oliv.—Fl. hgk. 50.

93. *Limonia monophylla*. Linn. China, Cochin. Sin: *sao peng lac*, lingua Cantonensi *xac may lac*. Lour. 333.

D. C. I. 535. *Atalantia monophylla*. India orient.—Loureiro's plant may be *Atalantia Hindsii* Oliv. or *A. buxifolia* Oliv.—Fl. hgk. 51. Osb. 40.

94. *Citrus aurantium*. Linn. China, Cochin. cult. Sin: *can xu* (柑樹). Lour. 569.

Osb. 37. As far as I know the above Chin. name in Canton is rather applied to the Mandarin orange.

95. *Citrus nobilis*. Lour. Abundanter in Cochinchina, etiam in China, quamvis Cantone illam non viderim. Sin: *tsem can*. 569.

Kerr bot. reg. t. 211. Mandarin Orange. Introduced into Europe from China in 1805.

96. *Citrus fusca*. Lour. Cochin. rarius in China. Sin: *chi keu*. (枳殼?). 571.

97. *Citrus margarita*. Lour. Canton. Sin: *chu tsu*. 570.

98. *Citrus madurensis*. Lour. China, Cochin. cult. Sin: *kim kuit* (金橘). 570.

In Peking the above Chinese name is applied to Bunge's *Citrus microcarpa*, which is I think the same as *Citrus japonica*. Thbg. fructu globoso. Hooker bot. mag. 6128 (1874) refers also Loureiro's *C. margarita* to this species.—See also Osb. 39.

99. *Citrus Decumana*. Linn. China, Cochin. Sin: *yeu zu* (柚樹). Una varietas *hiam yuen* (香櫞). Lour. 571.

Osb. 41. Largely cultivated in South-China.

100. *Citrus medica*. Linn. China, Cochin. cult. Lour. 568. Cultivated also in Peking.

101. *Citrus digitata* seu *Chirocarpus*. Varietas *Citri medicae*. Lour. 568.

This curious fruit with its lobes separating into fingerlike divisions is frequently seen in China. It is cultivated in Peking as well as the *Citrus medica Cedra*, of which it is a variety. Ten years ago I stated in my

paper: On the Study and Value of Chin. bot. Works, p. 12, that the Chinese fingered Citron is the *Citrus Sarcodactylis* or *Sarcodactylis helicterides* of Gaertner Fruct. III. 39. t. 185. But that was an error. The latter, which Gaertner had received from Guyana, is as Benth. et Hook. G. Pl. I. 305 correctly state, a variety of *C. decumana*.

102. *Citrus Limon*, varietas *Citri medicae*. Sin: *tsim pi xu* (青皮樹). Lour. 102.

Osb. 42. *Citrus medica*, var. *acida*.

103. *Gonius amarissimus*. Lour. China, Cochin. Sin: *a tam tsao*. 809.

D. C. II. 88. *Brucea sumatrana*. Roxb.—Fl. hgk. 60.

104. *Pimela nigra*. Lour. China, Cochin. Sin: *o lam* (烏欖). 495.

Osb. 45.—D. C. II. 80. *Canarium Pimela*. Koen.

105. *Pimela alba*. Lour. China, Cochin. Sin: *pa lam* (白欖). 495.

D. C. II. 80. *Canarium album*. Raeusch.—Osb. 44.—Dr. Hance, Chinese Olives. Journ. Bot. 1871.

106. **Melia Azedarach**. Linn. Cochin. Sin: *xun lien*. Lour. 329.

D. C. I. 621. Ceylon, Syria.—Parker, Canton, 森棟 *shen lien*.

107. **Aglaja odorata**. Lour. *Camunium sinense* seu *Tsju lang*. Rumph. Amb. VII. 28. China, Cochin, 216.

According to Parker in Canton 米仔蘭 *mi tsz' lan*.

108. **Euonymus chinensis**. Lour. Canton. Sin: *kam kua* 194.

D. C. II. 4. Spec. dubia.

109. *Salacia cochinchinensis*. Lour. Cochin. 642.

D. C. I. 571. *S. chinensis*. L. China. Idem ac *S. cochin.* ex adnotat. in herb. Banksiano.—Linn. Chin. pl. 46.

110. *Aubletia ramosissima*. Lour. Canton. Sin: *an pat pouc*. 110.

D. C. II. 22. *Paliurus Aubletia*. Schult.—Lour. specim. in herb. mus. Paris.—Fl. hgk. 66.

111. *Rhamnus Jujuba*. Linn. China, Cochin. cult. Sin: *ta tsao* (大棗). Lour. 195.

D. C. II. 21. *Zizyphus Jujuba*. Lam.—Journ. Bot. 1879. 10. Hance, Canton.

112. *Rhamnus Zizyphus*. Linn. Cochin. Canton. Sin. *hum tsao* (紅棗). Lour. 196.

D. C. II. 19. *Zizyphus vulgaris*. Lam.—Maxim. Rhamneae, the same as *Z. chinensis*. Lam. Frequent in China. Journ. Bot. l. c. Hance. Canton.

113. *Rhamnus saporifer*. Lour. In provinciis boreal. Sinarum. Sin: *soan tsao* (酸棗). 196.

In North-China the above Chinese name is applied to *Zizyphus vulgaris*. Lam.

114. *Rhamnus lineatus*. Linn. China, Cochin. Sin: *che lum*. Lour. 197.

Osb. 48.—Fl. hgk. 67. *Berchemia Loureiriana*. D. C. II. 23.

115. *Vitis vinifera*. Linn. China cult. rara Cochin. Sin: *pu tao* (葡萄). Lour. 192.

116. *Cissus umbellata*. Lour. Canton. Sin: *yong co loi*. 106.

Not observed after Lour.

117. *Cardiospermum Corindum*. Linn. Canton. Lour. 294.

D. C. I. 602. Brazilian plant.

118. *Sapindus abruptus*. Lour. Canton. Sin. *mu hoan xu* (無患樹). 293.

According to Parker this Chinese name in Canton is applied to *Sap. mukorossi*. Gaert. (Japan).

119. *Dimocarpus Lichi*. Lour. Colit. abund. China austr. Cochin. Sept. Sin: *Ly chi* (荔枝). 287.

Osb. 51.—Fl. hgk. 47. *Nephelium Litchi*. Camb.

120. *Dimocarpus Longan*. Lour. China, Cochin. cult. Sin: *lum yen* (龍眼). 288.

Osb. 51.—Fl. hgk. 47. *Nephelium Longan*.

121. *Rhus javanicum*. Linn. In sylvis cantoniens. Sin: *xiong tsat*. Lour. 228.

Osb. 53.—D. C. II. 67. *Rhus semialata*. L. var. *Osbeckii*.—Add. Fl. hgk. 101.

122. *Augia sinensis*. Lour. China, Cochin. Cambodia, Siam. Sin: *tsi xu* (漆樹). 411.

The Chinese Varnish tree.—G. Pl. I. 418. *Augia* est genus omnino ignotum; ex descr. multis notis cum *Rhoide* quadrat.

123. *Baryxylum rufum*. Lour. Montes Cochin. bor. Sin: *tie li mu* (鐵力木). 326.

G. Pl. I. 464. *Baryxylum*, genus dubium.

124. *Aloexylum Agallochum*. Lour. Montes Cochin. Sin: *chin hiam* (沉香). 327.

G. Pl. I. 464. Planta ignota. Comp. *Aloe wood* Semedo. 8.

125. *Trifolium Melilotus indica*. Linn. Canton. Sin: *sam pa lin*. Lour. 541.

D. C. II. 187, 189. Linn.'s plant *Melilotus sulcata*. Desf. and ex parte *M. parviflora*, Europe, North-Africa.

126. *Trifolium globosum*. Linn. Canton. Sin: *tsin li quong*. Lour. 542.

D. C. II. 196. Syria, Arabia, Italia.



127. **Indigofera tinctoria.** Linn. China, Cochin. Spont. cult. Sin: *lan tsao* (藍草), *ta cim* (大青).

Osb. 58.—Fl. hgk. 77.

128. **Indigofera rotundifolia.** Lour. Canton. Sin: *o tam sin*. 559.

D. C. II. 233. Species dubia.

129. **Indigofera coccinea.** Lour. Canton. Sin: *louc ham tsao*. 559.

D. C. II. 232. **Indig. hedyaroides.** Lam. ? India orient.

130. **Robinia amara.** Lour. China, Cochin. Sin: *khu sem* (苦參?) 556.

D. C. II. 262. Species dubia. In Japan the above Chinese name is applied to *Sophora angustifolia*. S. et Z.

131. **Glycyrrhiza echinata.** Linn. China borealis. Sin: *Fu chau can tsao* (府州甘草). Lour. 543.

D. C. II. 248. Tataria.

132. **Glycyrrhiza glabra.** Linn. China, in variis locis. Sin: *Fan chau can tsao* (汾州甘草). Lour. 543.

D. C. II. 247. Europa austr.—*Gl. glabra*, var. *glandulosa* has been observed in North-China and may yield a part of Chinese Liquorice root (*kan ts'ao*). According to Chinese books the best comes from the north-western provinces. *Fu chou* (see 131.) is an ancient name for *Fu ku hien* in N. Shensi, *Fan chou fu* is in Shansi.

133. **Diphaca cochinchinensis.** Lour. China, Cochin. cult. 554.

G. Pl. I. 515. Genus **Ormocarpum.** Beauv.

134. **Arachis asiatica.** Linn. China, Cochin. cult. Lour. 522.

D. C. II. 474. **Arachis hypogaea.** L.—Osb. 62.

135. **Hedysarum diphyllum.** Linn. Canton. Lour. 548.

D. C. II. 316. **Zornia angustifolia.** Sm. India orient.—Fl. hgk. 80.

136. **Hedysarum triflorum.** Linn. Canton. Sin: *sie thoi tsao*. Lour. 549.

D. C. II. 334. **Desmodium triflorum.** India, China.—Osb. 66.—Fl. hgk. 83.

137. **Hedysarum triquetrum.** Linn. Cochin. Lour. 547.

D. C. II. 326. **Desmodium triquetrum.** Ind. orient.—Osb. 63.—Fl. hgk. 83.

138. **Hedysarum pulchellum.** Linn. Canton. Sin: *a pho sien* (阿婆錢 Parker.) Lour. 548.

Osb. 69.—Fl. hgk. 83. **Desmodium pulchellum.** Benth.

139. **Hedysarum gangeticum.** Linn. Canton. Sin: *tsung loungh thu*. Lour. 547.

D. C. II. 327. **Desmodium gangeticum.** Ind. orient.—Osb. 64.

140. **Hedysarum elegans.** Lour. Canton. Sin: *hap chiong tsao*. 549.

D. C. II. 339. **Dicerma elegans.**—Fl. hgk. 83. **Desmodium elegans.** Benth.

141. *Hedysarum lagopodioides*. Linn. Canton. Sin: *Tsui fum tsao*. Lour. 549.

Osb. 70.—D. C. II. 324. *Uraria lagopoides*.

142. *Hedysarum reniforme* Linn. Canton. Sin: *lo im tsao*. Lour. 545.

D. C. II. 324. *Lourea reniformis*. De Cand. quotes only Lour. and his spec. in Mus. Paris.—The plant of Linn. is referred to *Desmodium reniforme* (II. 327.)

143. **Vicia Faba**. Linn. China cult. Cochin. rara. Sin: *sam teu* (蠶豆). Lour. 540.

Much cultivated also in N. China.

144. **Pisum sativum**. Linn. China, Cochin. cult. non frequens. Lour. 539.

Largely cultivated in N. China.

145. **Abrus precatorius**. Linn. Cochin. Lour. 520.

Osb. 72.—Fl. hgk. 92.

146. *Dolichos Soja*. Linn. China, Cochin. cult. Sin: *hoam teu* (黃豆) Lour. 537.

D. C. II. 396. *Soja hispida*. Moench.—G. Pl. I. 530. *Glycine Soja*.—Osb. 73.—Largely cultivated throughout China.

147. *Erythrina corallodendron*. Linn. China aust., Cochin. Sin: *tum ye wu* (冬葉樹). Lour. 519.

D. C. II. 412. *Eryth. indica*. Lam.

148. **Phaseolus vulgaris**. Linn. Cochin. raro. Lour. 527. Cultivated in N. China.

149. **Phaseolus radiatus**. Linn. Colit. China, Cochin. Sin: *liu teu* (綠豆). Lour. 529.

Osb. 74.—Cultivated throughout China.

150. **Phaseolus Mungo**. Linn. Colit. China, Cochin. Sin: *siao teu* (小豆), *tsiam teu* (紅豆). Lour. 530.

D. C. II. 395. India orient.—The second Chinese name Lour. gives is applied in Peking to *Dolichos sinensis*.

151. *Dolichos trilobus*. Linn. Cult. China, Cochin. *Tubera esculenta*. Sin: *ken co* (根葛). Lour. 535.

D. C. II. 402. Lour.'s plant (non Linn.) *Pachyrhizus trilobus*.—See above Martink 26.

152. *Dolichos tetragonolobus*. Linn. China, Cochin. Lour. 532.

D. C. II. 403. *Psophocarpus tetragonolobus*. Ind. orient.

153. **Dolichos sinensis**. Linn. Cult. China, Cochin. Sin: *tau co, teu co* (豆角). Lour. 530.

Osb. 75.—Largely cultiv. in China.

154. *Dolichos ensiformis*. Linn. China, Cochin. Colit. Sin: *tao teu* (刀豆). Lour. 531.

- D. C. II. 404. *Canavalia ensiformis*. India orient.—Osb. 76.—Fl. hgk. 88.
155. **Dolichos Catjang**. Linn. China, Cochin. cult. Lour. 538.  
 var. 1. *he teu* (黑豆).  
 var. 2. *min teu* (麵豆).  
 var. 3. *siao hum teu* (小紅豆).  
 D. C. II. India orient.—*Hei tou* in Peking is a black variety of *Glycine Soja*.—*Min tou* in Canton (Parker) is *Cajanus indicus*. Spr.
156. *Dolichos unguiculatus*. Thbg. China. In *Lusitaniam translatus*. Lour. 531.  
 D. C. II. 400. *Dolichos umbellatus*. Thbg. Japonia.
157. **Dolichos biflorus**. Linn. Canton. Sin: *san cu*. Lour. 537.  
 D. C. II. 398. India orient.
158. *Dolichos purpureus*. Linn. China, Cochin. cult. Sin: *tsu pien teu* (紫扁豆). Lour. 534.  
 D. C. II. 401. *Lablab vulgaris*. Savi. var. *purpureus*. India orient. Aegypt.—Cultivated throughout China.
159. *Dolichos albus*. Lour. China, Cochin. cult. Sin: *pe pien teu* (白扁豆). 534.  
 D. C. II. 402. *Lablab perennans*. The above Chinese name is applied in Peking to *Lablab vulgaris*. var. *albiflorus*.
160. *Cytisus Cajan*. Linn. China, Cochin. Sin: *xan teu ken* (山荳根). Lour. 565.  
 D. C. II. 406. *Cajanus flavus*. India orient.—Fl. hgk. 89.
161. **Rhynchosia volubilis**. Lour. Canton. Sin: *chio tau* 562.  
 D. C. II. 385. Specim. Lour. in hb. Mus. Paris.—Fl. hgk. 90.
162. **Pterocarpus flavus**. Lour. In *sylvis sinensibus*. Sin: *hoam pe mo* (黃皮木). Imperfectly known to Lour. 525.
163. *Derris trifoliata*. Lour. Provincia Canton. Sin: *san liao tao*. 526.  
 D. C. II. 415. Specim. in hb. Mus. Paris.—Fl. hgk. 94. *Derris uliginosa*, var. *Loureiri*.
164. *Robinia mitis*. Linn. China, Cochin. Sin: *khu sem* (苦參?). Lour. 555.  
 D. C. II. 416. *Pongamia chinensis*. (Lour.'s plant). Non satis nota.—Hook. et Arn. bot. Beech. 181. South-China.—*P. glabra* Vent (Rob. mitis. L.) has been observed in Hongkong. Fl. hgk. 94.
165. *Robinia flava*. Lour. China borealis. Sin: *hoam khin* (黃芪?) 556.  
 D. C. II. 263. Species dubia.—There is some reason for supposing that Lour. intended the above Chinese characters, confounding the second,

which is pronounced *Ki* with 芹 *kin*.—*Huang ki* in Peking is *Sophora flavescens*. Ait.

166. *Mimosa corniculata*. Lour. Canton. Sin: *hoai hoa*. (槐花). 800.

D. C. II. 430. Spec. dubia.—The above Chin. name is applied in Peking, and in Chin. botan. works to *Sophora japonica*. L. a common tree in China.—Fl. hgk. 95.—Lour.'s description of his *Min. corniculata* agrees with *S. japonica*, with the exception of the bipinnate leaves. But he repeatedly commits this error in taking a small branch for a common leafstalk. See further on 409, *Campsis adrepens*.

167. *Anagyris foetida*. Linn. Canton. Sin: *pa pai*. Lour. 318.

G. Pl. I. 556. Lour.'s plant (not Linn.'s, which is a native of Europe) is referred by Benth. and Hooker to *Ormosia*.

168. *Caesalpinia Sappan*. Linn. Cochin. Sin: *su fam mo* (蘇方木). Lour. 320.

This tree is probably not found in China, but the Chinese know well the Sapan wood.

169. *Guilandina Bonducella*. Linn. Canton. Sin: *nam sie lac*. Lour. 325.

Fl. hgk. 96.

170. *Mimosa fera*. Lour. China, Cochin. Sin: *tsao kie* (皂莢). 801.

D. C. II. 429. is right in supposing, that this is a *Gleditschia*. The above Chinese name is applied to *Gleditschia [sinensis]*. Lam. a common tree in Peking as well as in S. China.—Fl. hgk. 100.

171. *Poinciana pulcherrima*. Linn. China, Cochin. Lour. 319.

D. C. II. 484. *India orientalis*.—Cultivated in Canton.

172. *Cassia Tora*. Linn. Cochin. Lour. 322.

173. *Cassia obtusifolia*. Linn. China, Cochin. Sin: *tsao kit lam* (草決明). Lour. 323.

Fl. hgk. 98. *C. obtusifolia* is referred to *C. Tora*.

174. *Cassia procumbens*. Linn. China, Cochin. Lour. 324.

Osb. 78.—D. C. II. 504. *Cassia pumila*. Lam. I. 651. China, India.

175. *Cassia Sophera*. Linn. China austr.—Sin: *xy tsi tau*, *kiue mim tsu*. (決明子). Lour. 324.

Osb. 77.—D. C. II 492. India, China.—Peking, cultivated.

176. *Tamarindus indica*. Linn. Cult. Cochin. Lour. 488. Osb. 79.

177. *Mimosa arborea*. Linn. Canton. Sin: *yam mu* (絨木?). Lour. 800.

Linn.'s plant is a native of America. Thunberg's *M. arborea* of Japan, quoted by Lour., is *Acacia Nemu*. Willd. Frequent in N. China.

178. *Mimosa farnesiana*. Linn. Cochin. Lour. 801.



Fl. hgk. 101. *Acacia farnesiana*. Willd.

179. ***Prunus domestica***. Linn. In plerisque Sinarum provinciis. Sin: *muei xu*. (梅樹). Lour. 388.

Largely cultivated in N. China, but more commonly termed 李 *li*.

180. ***Amygdalus persica***. Linn. China, cult. Sin: *tao ho gin* (桃核仁). Lour. 386.

Cultivated throughout China.

181. ***Amygdalus pumila***. Linn. China. Sin: *dao hoa houn* (桃花紅). Lour. 387.

Comp. Maximowicz, *Fragm. fl. Asiae orient.* 1879. p. 14.

182. ***Amygdalus communis***. Linn. Habitat et colitur affatim in China. Sin: *him ho gin* (杏核仁) Lour. 386.

As my friend Dr. Hance wrote me some years ago, he has never heard of the Almond tree having been observed in China. The *A. communis* in Bunge's enum. pl. Chin. bor. is *Persica Davidiana*. The Chinese name Lour. gives for the Almond is as far as I know only applied to the Apricot, the kernels of which are used in China like almonds in the West.

183. ***Spiraea cantoniensis***. Lour. Canton. Sin: *tsi chouc hoa* (珍珠花). 394.

Flor. hgk. 105.

184. ***Rubus parvifolius***. Linn. China, Cochin. Lour. 398.

D. C. II. 564. Osb. 81.—Fl. hgk. 105.

185. ***Fragaria vesca***. Linn. Habitat et colitur in China. Sin: *fu puen tsu* (覆盆子). Lour. 398.

Probably another species.—*Fragaria elatior*. Ehrh. has been observed by my friend Mr. W. Hancock in the mountains west of Peking. (Maxim. l. c. p. 17.)

186. ***Potentilla fruticosa***. Linn. China borealis. Sin: *yam chi cho* (羊躑躅). Lour. 399.

Frequent in N. China. But the Chinese name Lour. applies to the plant is wrong, being that for *Rhododendron*.

187. ***Rosa centifolia***. Linn. China. Sin: *ta mui hoa* (大玫瑰花). Lour. 396.

Not observed in China after Lour.

188. ***Rosa cinnamomea***. Linn. China, Cochin. cult. Sin: *mui hoa* (玫瑰花). Lour. 395.

Peking, cultivated.

189. ***Rosa spinosissima***. Linn. Flos rubescens. Cochin. Lour. means, that this may be *Rosa sinica*. Linn. Lour. 395.

190. ***Rosa indica***. Linn. China, Cochin. Sin: *tsiam hoa* (薔花). Lour. 396.

Osborne 82.—Fl. hgk. 106.

191. **Rosa nankinensis**. Lour. Nanking. Sin: *tsiao mui* *hoa*. 397.

According to Dr. Regel. Monogr. Rosar. 357. a variety of *Rosa semper-florens* Act. (a native of China.)

192. **Rosa alba**. Linn. China, Cochin. Sin: *kin ym* (金纓), Lour. 396.

193. **Pyrus Malus**. Linn. China borealis. Sin: *pim po* (頻婆). Lour. 393.

Cultivated in N. China. \*

194. **Pyrus communis**. Linn. Canton. cult. Sin: *ly* (梨). Lour. 393.

The Pears cultivated in N. China are for the greater part varieties of *P. chinensis*. Lindley.

195. *Pyrus Cydonia*. Linn. Pomum ovatum. China borealis. Sin: *mu qua* (木瓜). Lour. 394.

Probably *Cydonia sinensis*. Thouin, cultivated in the northern provinces.

196. **Mespilus pyracantha**. Linn. China, agr. et cult. Sin: *tan kieou tsu* (棠棣子), *xan cha* (山楂). Lour. 392.

In Peking the above Chinese names are applied to *Crataegus pinnatifida*. Bge., in Japan to *Crataegus cuneata*. Sieb. et Zucc. and *Crataegus sanguinea*. Pall.

197. *Crataegus bibas*. Lour. Macao, Canton. Sin: *pi pa zu* (枇杷樹). 391.

Fl. hgk. 108. **Eriobotrya japonica**. Lindl.

198. *Crataegus rubra*. Lour. Canton. Sin: *u ly mu*. 391.

D. C. II. 630. **Raphiolepis rubra**. Lindl. Fl. hgk. 108. Benthams regards it as identical with *R. indica*.

199. *Opa metrosideros*. Lour. Cochin. 379.

Decaisne, Pomac. 133. identifies it with **Raphiolepis indica**. Lindl. Fl. hgk. 107.—But in the G. Pl. I. 719. it is combined with *Siszygium* resp. *Eugenia*.

200. **Saxifraga chinensis**. Lour. Canton. Sin: *ho ngi* *tsao* (虎耳草). 345.

D. C. IV. 43. *Saxifraga sarmentosa*. L.—Linn. Chin. pl. 84. Maxim. Dec. XII. means that Lour.'s species is different.

201. *Primula mutabilis*. Lour. Canton, cult. Sin: *sau cau* *hoa* (繡毯花). 127.

D. C. IV. 15. **Hydrangea Hortensia**. China, Japan cult.

202. *Dichroa febrifuga*. Lour. China, Cochin. Sin: *cham* *chan*. 369.

Fl. hgk. 128.

203. *Cedrela rosmarinus*. Lour. North-Cochin. Macao. Sin: *ti phu pi*. 199.

D. C. IV. 6. *Itea*. Spec. dubia.

204. *Cotyledon laciniata*. Linn. Cochin. 352.

D. C. III. 395. *Kalanchoe laciniata*. Java, Molucc. Probably the same as *K. ceratophylla*. Haw. Has been observed in the province of Yünnan. (Hook. fl. ind.)

205. *Crassula pinnata*. Linn. Cochin. China? Lour. 231.

*Kalanchoe pinnata*. Pers.—*Bryophyllum calycinum* Salisb. Fl. hgk. 127. Add. fl. hgk. 103.

206. *Sedum anacampseros*. Linn. China, Cochin. Sin: *pa touc san* (扒毒散). Lour. 353.

D. C. III. 403. European species.

207. *Sedum stellatum*. Linn. Canton. Sin: *cheu li* Lour. 353.

D. C. III. 404. European species.

208. *Drosera umbellata*. Lour. China. Sin: *ku tsim tsao* (穀精草). 232.

Lour. applies the same Chinese name to *Eriocaulon*. See 624.

209. *Drosera rotundifolia*. Linn. Cochin. Lour. 232.

Hook. et Arn. bot. Beech. 167. *Drosera Loureiri*.—Fl. hgk. 130.

210. *Quisqualis indica*. Linn. Canton, Cochin. Sin: *xi kiun tsu* (使君子). Lour. 336.

Hance Journ. Bot. 1879. 10. Canton province, Hainan. The same as *Q. sinensis*. Lindl.

211. *Psidium pyrifera*. Linn. and *Ps. pomiferum*. Linn. China, Cochin. cult. Lour. 378, 379.

Fl. hgk. *Psidium Guyava*. Linn.—Osb. 86.

212. *Psidium caninum*. Lour. Canton. Sin: *pa hoa*. 379.

213. *Myrtus canescens*. Lour. Cochin. 381.

D. C. III. 240. *Myrtus tomentosa*. Ait. Fl. hgk. 121.

214. *Eugenia malaccensis*. Linn. India, Malacca, Macao. Lour. 374.

215. *Caryophyllus aromaticus*. Linn. In sylvis Cochin. borealis. Sin: *xan tim hiam* (山丁香). Lour. 406.

D. C. III. 262. In Moluccis.—

216. *Opa odorata*. Lour. Cochin. 377.

D. C. III. 261. *Syzygium odoratum*. Staunton. China.—G. Pl. I. 719. *Eugenia odorata*.

217. *Osbeckia chinensis*. Linn. Canton. Sin: *kam yong lu* (金香爐). Lour. 281.

Osb. 87.—Fl. hgk. 114.

218. **Melastoma dodecandrum**. Lour. Canton, Cochin. Sin: *pe gie hong* (百日紅). 336.

219. **Blastus cochinchinensis**. Lour. Cochin. 643.

Fl. hgk. 116. Add. fl. hgk. 103. **Anplectrum parviflorum**. Bth. Observed also in Formosa.

220. **Lawsonia spinosa**. Linn. Cochin. cult. Lour. 281.

D. C. III. 91. **Lawsonia alba**. Lam.—Osb. 92.

221. **Lagerstroemia indica**. Linn. China, Cochin. spont. cult. Sin: *sat chu moi hoa* (山紫薇花). Lour. 415.

Linn. Chin. pl. 93.—Fl. hgk. 112.

222. **Punica granatum**. Linn. Habitat et colitur in China et Cochin. Sin: *han xe lieu* (安石榴). Lour. 383.

Osb. 94.

223. **Epilobium tetragonum**. Linn. China, Cochin. Sin: *soy hoang teng*. Lour. 276.

D. C. III. 55. Lour.'s plant (non L.) **Jussiaea tetragona**. Spr.

224. **Cubospermum palustre**. Lour. Cochin. 337.

D. C. III. 54. **Jussiaea repens**. Linn.—Osb. 95. Dr. Hance. Canton. Journ. Bot. 1880. p. 261.

225. **Gaura chinensis**. Lour. Canton. Sin: *san si tsao*. 276.

226. **Trapa chinensis**. Lour. Canton. Sin: *ki xi* (菱實), *leng co* (菱角). 109.

D. C. III. 64. **Trapa bicornis**. Linn. fl.—Osb. 96.—In Peking the above names are applied to *Tr. bispinosa*. Roxb.

227. **Astranthus cochinchinensis**. Lour. Cochin. 274.

Fl. hgk. 122. **Homalium fagifolium**. Benth.

228. **Passiflora coerulea**. Linn. Canton. spont. Sin: *u si hoa*. Lour. 644.

Roem. Peponiferae 184. Lour.'s plant (non Linn.) *P. Loureiri*. Don. Meyen obs. bot. 337. *P. coerulea*, Macao, cult.

229. **Carica Papaya**. Linn. China, Cochin. cult. Sin: *man xeu co* (萬壽果). Lour. 772.

American plant cultivated throughout the tropics.

230. **Trichosanthes anguinea**. Linn. China, Cochin. cult. esculenta. Lour. 722.

Linn. Chin. pl. 97.

231. **Cucurbita Lagenaria**. Linn. China, Cochin. cult. Sin: *hu qua* (瓠瓜), *ho lo* (壺盧). Lour. 728.

D. C. III. 299. **Lagenaria vulgaris**. Sav.—Osb. 98.



232. *Cucumis acutangulus*. Linn. China, Cochin. cult. Lour. 727.

D. C. III. 302. *Luffa acutangula*.—Lin. Chin. pl. 99.

233. *Momordica Luffa*. Linn. China, Cochin. cult. Sin: *su qua* (絲瓜). Lour. 724.

D. C. III. 303. *Luffa aegyptiaca*. (i. e. Linn.'s plant). Lour.'s plant according to Naudin (Cucurb. in Ann. sc. nat. XII, 1859, 119.) *Luffa cylindrica*. Roem.

234. *Momordica cylindrica*. Linn. Canton, cult. Sin: *soy qua* (絲瓜). Lour. 725.

According to Naudin, l. c. the same as the preceding.

235. ***Momordica Charantia***. Linn. China, Cochin. cult. Sin: *khu qua* (苦瓜). Lour. 725.

Flora hgk. 125.

236. *Muricia cochinchinensis*. Lour. China, Cochin. Sin: *mo pie su* (木鼈子). 733.

G. Pl. I. 825. *Momordica cochinchinensis*.

237. *Cucurbita Pepo*. Linn. China, Cochin. cult. Sin: *tum qua* (冬瓜). Lour. 728.

The above Chin. name is applied in Peking to *Benincasa cerifera*. Lav.—Naudin l. c. 87 also identifies Lour.'s plant with *Benincasa*.

238. ***Cucumis sativus***. Linn. China, Cochin. cult. Sin: *hoam qua* (黃瓜).

The Cucumber is much cultivated throughout China.

239. ***Cucumis Melo***. Linn. China, Cochin. cult. Sin: *can qua* (甘瓜). Lour. 726.

Various varieties of Melons are cultivated in N. China, as well as in the South.

240. *Cucurbita Melopepo*. Linn. China, Cochin. cult. Sin: *nan qua* (南瓜), *fan qua* (翻瓜). Lour. 729.

Naudin l. c. 84. Lour.'s plant (non Linn.) *Cucurbita moschata*. Duch.

241. ***Cucurbita Citrullus***. Linn. China, Cochin. cult. Sin: *si qua* (西瓜). Lour. 730.

Osb. 101. The Water Melon is largely cultivated in all parts of China.

242. *Solena heterophylla*. Lour. China, Cochin. Sin: *khu leu* (栝樓), *tien hoa fuen* (天花粉). 629.

D. C. III. *Bryonia heterophylla*.—G. Pl. I. 820. *Coccinia*. Spec. dubia. In Peking the above Chinese names are applied to *Trichosanthes palmata*. Roxb.

243. *Bryonia hastata*. Lour. Canton. Sin: *si toung qua*. 731.

Fl. hgk. 124. *Karivia umbellata*. Arn.—Add. Fl. hgk. 104. *Zehneria umbellata*. Thw.

244. **Melothria indica.** Lour. Cochin. 43.

Hce. Add. Fl. hgk. 104.

245. *Mollugo triphylla.* Lour. Canton. Sin: *ha khim su.* 79.

Osborne 103.—Fl. hgk. 23. *Mollugo stricta.* Linn.—Benth. combines also *M. pentaphylla.* Linn. with this plant.

246. *Trisanthus cochinchinensis.* Lour. China, Cochin. 219.

D. C. IV. 63. *Hydrocotyle abbreviata.* Rich.

247. **Sium sisarum.** Linn. China, Cochin. cult. Sin: *xei kin* (水勤). Lour. 223.

This plant has never been observed in China. See above Linn. Chin. pl. 106.—The above Chinese name is applied in Japan to *Oenanthe stolonifera.* D. C.

248. *Sium graecum.* Linn. Cochinchina, China. ? Lour. 223.

Linn.'s plant as well as that of Lour. are dubious. Comp. D. C. IV. 159. *Ligusticum graecum* and 143 *Kundmannia sicula.*

249. *Anethum Foeniculum.* Linn. Abundanter in China, colit. etiam in Cochin. Sin: *hoei hiam* (回香). Lour. 226.

D. C. IV. 142. *Foeniculum vulgare.* Gaertn. Europa.—Much cultivated in Peking.

250. *Athamanta chinensis.* Linn. China, Cochin. cult. spont. Sin: *xe choan* (蛇床). Lour. 222.

Lin. Chin. pl. 108.—D. C. IV. 152. *Selinum* (*Cnidium*) *Monnieri.*

251. **Coriandrum sativum.** Linn. Colitur in China, raro in Cochin. Sin: *xe hu yu.* Lour. 225.

D. C. IV. 250 considers Loureiro's Coriander a dubious plant. But *C. sativum* is much cultivated in North-China as well as in the South.—Fl. hgk. 135.

252. **Daucus Carota.** Linn. Canton, indeque in Cochin. translata. Sin: *hu lu pa* (胡蘿蔔). Lour. 222.

Cultivated throughout China.

253. *Caucalis orientalis.* Linn. Canton. Lour. 221.

Hance advers. 15. *Torilis praetermissa.* Canton.

254. **Aralia chinensis.** Linn. Cochinchina. Lour. 234.

Osborne 109.—Fl. hgk. 135.

255. **Aralia octophylla.** Lour. Cochin: Canton (varietas). 233.

D. C. IV. 258. Dubia.

256. **Panax fruticosum.** Linn. China, Cochin. cult. Lour. 806.

D. C. IV. 254. Java.

257. *Plectronia chinensis.* Lour. Prov. Canton. 201.

D. C. IV. 252. **Panax Loureirianum.** Perhaps the same as *Panax aculeatum* or *Acanthopanax aculeata.* Osborne 111.—Add. Fl. hgk. 104.

258. *Aralia palmata*. Lour. China. Sin: *u kia pi* (五加皮). 233.

D. C. IV. 264. *Hedera scandens*.

259. *Stylidium chinense*. Lour. Canton. Sin: *pau tsau*. 273.

D. C. IV. 267. *Marlea begonifolia*. Rxbg. Nepal. China.

260. *Sambucus nigra*. Linn. In montanis Sinensibus. Sin: *u chu yu* (吳茱萸). Lour. 226.

D. C. IV. 323. *Sambucus Loureiriana*. Dubia.

261. *Phyteuma bipinnata*. Lour. Suburb. Canton. Sin: *tcha leang tsao*. 172.

D. C. IV. 323. *Sambucus ebuloïdes* (specim. Lour. in Mus. Par.)

262. *Lonicera Xylosteum*. Linn. China, Cochin. Sin: *kim ngan hoa* (金銀花). Lour. 186.

D. C. IV. 334. *Lonicera Loureiri*. Dubia.—In Peking the above Chinese name is applied to *L. chinensis*. Wats.

263. *Lonicera periclymenum*. Linn. In multis locis imp. Sinensis. Sin: *gin tum* (忍冬). Lour. 185.

D. C. IV. 333. *Lonicera confusa*.?—Fl. hgk. 144. *Lon. multiflora*. Champ.—Maxim. diagn. plant. nov. asiat. II. 57.

264. ***Polyozus lanceolata***. Lour. Canton. Sin: *am san cung*. 94.

Gen. Pl. II. 29. Specim. in Mus. Britann. Genus dubium. D. C. IV. 494. Genus Rubiacearum.

265. *Cephalanthus montanus*. Lour. China. Sin: *san yong mai*. 84.

D. C. IV. 622. Planta ignota, certe non *Cephalanthus*.

266. ***Cephalanthus occidentalis***. Linn.? China. Sin: *soy yong mai*. Lour. 83.

G. Pl. II. 29. Planta dubia.—D. C. IV. 539. *Ceph. ? orientalis*. Roem. et Schult. (non Linn.).—Comp. Fl. hgk. 146. *Ceph. occidentalis* (sub *Adina*.)

267. *Oldenlandia repens*. Linn. Canton. Sin: *ha kim tsao*. Lour. 98.

D. C. IV. 419. *Dentella repens*. Forst.

268. ***Oldenlandia paniculata***. Linn. Cochin. Lour. 99. Fl. hgk. 152.

269. ***Hedyotis herbacea***. Linn. Cochin. Lour. 98. Osb. 114.—Fl. hgk. 151, note.

270. *Mussaenda chinensis*. Lour. Suburb. Canton. 189.

D. C. IV. 373. Dubia, a genere removenda.

271. *Ocyceros sinensis*. Lour. Canton. Sin: *cai tsoi lac*. 187. Fl. hgk. 155. ***Randia sinensis***. Roem. et Sch.

272. **Gardenia florida.** Linn. China, Cochin. Sin: *chy tsu* (梔子). Lour. 183.

Linn. Chin. pl. 117.—Fl. hgk. 153.

273. *Gardenia volubilis.* Lour. Suburb. Canton. Sin: *zang lan than*. 184.

D. C. IV. 383. Dubia, a *Gardeniis* videtur excludenda.

274. *Genipa? flava.* Lour. Canton. Sin: *uat thau cay*. 185.

275. *Ixora coccinea.* Linn. Cochin. Lour. 95.

D. C. IV. 486. ***Ixora stricta.*** Rxbg.—Osborne. 118.—Fl. hgk. 158.

276. *Pavetta arenosa.* Lour. Canton. Sin: *ta sa*. 92.

D. C. IV. 493. A genere forte ab ordine excludenda.

277. *Gentiana scandens.* Lour. China, Cochin. Sin: *ki si thun* (雞屎藤). 213.

D. C. IX. 119. ***Paederia foetida.*** Linn.—Fl. hgk. 162.—

278. *Dysoda fasciculata.* Lour. China, Cochin. Sin: *man tsien yong*. (滿天星). 181.

D. C. IV. 575. ***Serissa foetida.*** Comm. *Lycium foetidum* Linn. fil. suppl. 150.—Journ. Bot. 1874. 183. Hance in Amoy. spont. Bullock? in the prov. of Hunan. (Journ. Bot. 1880 p. 261.)

279. ***Galium tuberosum.*** Lour. China, Cochin. cult. Sin: *hoam cim* (黃精). 99.

D. C. IV. 611. Pl. dubia.—In Chinese botan. works the above Chinese name is applied to various species of *Polygonatum*. See *Chi wu ming shi t'u k'ao* VIII. tab. 18, 19, 20, 21.—In Peking *Pol. sibiricum*. Red. bears this name.

280. ***Crucianella angustifolia.*** Lour? China. Sin: *uei lin sien* (see above 1, *clematis*). Lour. 100.

D. C. IV. 586. European spec.

281. ***Scabiosa cochinchinensis.*** Lour. China, Cochin. Sin: *ti tan tsao* (地膽草). 85.

D. C. IV. 661. Stirps dubia.—The above Chin. name is applied in Canton to *Elephantopus scaber*. Linn. (Parker.)

282. *Spilanthus tinctorius.* Lour. China, Cochin. cult. 590.

D. C. V. III. ***Adenostemma tinctorium.*** Cass.

283. ***Ageratum ciliare.*** Linn. Canton. Lour. 591.

D. C. V. 109. India orient. Spec. obscura.

284. ***Solidago cantoniensis.*** Lour. Canton. Sin: *kam siong hoa*. 612.

Comp. Osb. 123.

285. ***Solidago decurrens.*** Lour. Canton. Sin: *hoang kam siong*. 612.

D. C. V. 342. Spec. dubia.



286. **Pteronia tomentosa**. Lour. Canton. Sin: *chu hoa mu*. 597.

287. *Matricaria cantoniensis*. Lour. Canton. Sin: *hi su tsu*. 609.

D. C. VI. 44. *Hisutsua cantoniensis*. (Lour. specim. in hb. Mus. Paris.).—Fl. hgk. 174. **Boltonia indica**. Bth.—Osb. 124.

288. *Aster indicus*. Linn. China, spont. cult. Sin: *ma lan hoa* (馬蘭花). Lour. 615.

Osb. 124.—D. C. V. 303. *Asteromoea indica*. Bl.—Hce. add. fl. hgk. 107. Variety of *Boltonia indica*.

289. *Aster chinensis*. Linn.—Lour. 615, mentions this plant (**Callistephus chinensis**. Nees.) but states that he has not seen it.—Osb. 125.

290. **Erigeron hirsutum**. Lour. Canton. Sin: *ha si kouc*. 611.

291. **Baccharis chinensis**. Lour. Canton. Sin: *xan po leng*. 604.

D. C. VII. 283. Hook. et Arn. bot. Beech. 195. South-China.

292. *Conyza chinensis*. Linn. Coch. Lour. 606.

D. C. V. 445. **Blumea chinensis**.—Osb. 226.—Fl. hgk. 177.

293. *Baccharis Salvia*. Lour. (*Conyza balsamifera*. Linn.) 603.

D. C. V. 447. **Blumea balsamifera**.—Humbury Science pap. 393. Peculiar Camphor from China.

294. *Baccharis Dioscorides*. Linn. China, Coch. cult. spont. Sin: *laong fu su*. Lour. 603.

D. C. V. 450. **Pluchea Dioscorides**.—In Aegypto.

295. *Conyza hirsuta*. Linn. China, Coch. Sin: *ho mi tsao*. Lour. 606.

D. C. V. 453. **Pluchea hirsuta**. Less.—Osb. 127.

296. **Sphaeranthus cochinchinensis**. Lour. China, Coch. 623.

297. **Gnaphalium indicum**. Linn. Coch. Lour. 608.

Flor. hgk. 188.

298. **Bupthalmum oleraceum**. Lour. China, Coch. cult. 618.

299. **Xanthium strumarium**. Linn. China, Coch. Lour. 689.

Linn. Chin. pl. 132.—Fl. hgk. 181.

300. **Siegesbeckia orientalis**. Linn. Cochinchina, China, sed Lour. ibi non obvia. 616.

Osb. 133.—Fl. hgk. 182.

301. 302. *Eclipta erecta*. Linn. et *E. prostrata* Linn. Lour. 617. 618.

Osborne. Ct. 134.—Fl. hgk. 181. Benth. combines both of them with *Eclipta alba*. Haenk.

303. *Verbesina calendulacea*. Linn. Canton. Sin: *fan khi kouc* (蟛蜞菊 Parker.). Lour. 619.

D. C. V. 539. *Wedelia calendulacea*. Less.—Osborne. 135—Fl. hgk. 182.

304. *Helianthus giganteus*. Linn. China, Cochin. cult. Sin: *hoam quei hoa* (黃葵花). Lour. 623.

D. C. V. 591. *Helianthus cochinchinensis*? Pers.

305. *Verbesina spicata*. Lour. China, Cochin. cult. Sin: *thien cai tsai*. 620.

D. C. V. 618. Dubia.

306. *Coreopsis biternata*. Lour. Canton. 605.

307. *Bidens bipinnata*. Linn. China, Cochin. Lour. 596. Fl. hgk. 183.

308. *Bidens pilosa*. Linn. Cochin. Lour. 596. Fl. hgk. 183.

309. *Coreopsis leucorrhiza*. Lour. Canton. Sin: *jam fum* (防風). 622.

D. C. V. 605. *Bidens leucorrhiza*?

310. *Tagetes patula*. Linn. China, Cochin. cult. Lour. 616. Cultivated throughout China.

311. *Cotula anthemoides*. Linn. Cochin. Lour. 602. Fl. hgk. 185.

312. *Chrysanthemum procumbens*. Lour. China, Cochin. Sin: *siao kio hoa*. (小菊花). 610.

Osborne. 136.—Fl. hgk. 184.—Maximow. Dec. X. 516. *Pyrethrum* (*Chrysanthemum*) *indicum* Cass. var. & *genuinum*. (the wild growing form.)

313. *Chrysanthemum indicum*. Linn. China, Cochin. cult. Sin: *ta kio hoa*. (大菊花). Lour. 610.

Osborne. 137.—Maxim. l. c. 518. *Pyrethrum sinense*. Sab. var. *plenum*.

314. *Centipeda orbicularis*. Lour. Cochin. 602.

Linn. Chin. pl. 138.—Fl. hgk. 186.

315. *Artemisia chinensis*. Linn. Canton. Ex foliis fit *Moxa*. Sin: *khi ngai* (蕪艾). Lour. 600.

Linn. Chin. pl. 139.—Maxim. Dec. XI. *Tanacetum chinense*. A. Gray.

316. *Artemisia vulgaris*. Linn. China, Cochin. spont. cult. Sin: *ngai ye* (艾葉). Lour. 600.

Osborne. 140.—Fl. hgk. 187.

317. *Artemisia annua*. Linn. Peking. Sin: *tsao cao* (草蒿). Lour. 599.

Fl. hgk. 187.—Common in North-China. 香蒿 *hiang hao*.

318. **Artemisia Abrotanum**. Linn. China, Cochin. cult. spont. Sin: *yn chin hao* (茵陳蒿). Lour. 598.

D. C. VI. 106. Stirps Lour. certe diversa.

319. **Artemisia aquatica**. Lour. China, Cochin. cult. Sin: *hai tum*. Lour. 598.

D. C. VI. 126. An vera Artemisiae spec? *Eupatorium foeni culaceum* Bess?

320. **Artemisia judalca**. Linn. China, Cochin. Sin: *ngaoc fu yong*. Lour. 597.

D. C. VI. 106. Stirps Lour. videtur diversa.

321. *Tussilago Furfara*. Linn. China borealis. Sin: *kuan tum hoa* (款冬花). Lour. 614.

In Japan the above Chin. name is applied to *Petasites japonicus*. Miq.

322. *Cacalia pinnatifida*. Lour. Canton. Sin: *cien san sat* (田三七) 593.

D. C. VI. 301. *Gynura*? *pinnatifida*.—Cultivated in Peking.

323. *Senecio divaricatus*. Linn. Canton. Sin: *kam siun lin*. Lour. 613.

D. C. VI. 301. *Gynura divaricata*.—Osb. 142.

324. *Cacalia procumbens*. Lour. China, Cochin. cult. spont. Lour. 592.

D. C. VI. 298. *Gynura sarmentosa*?

325. *Cacalia bulbosa*. Lour. China, Cochin. cult. spont. Sin: *san sat* (三七). 592.

D. C. VI. 301. *Gynura bulbosa*. Hook. et Arn. bot. Beech. 194. Fl. hgk. 189. identifies the latter plant with *G. pseudochina*. D. C.

326. *Cacalia sonchifolia* Linn. Cochin. Lour. 593.

D. C. VI. 302. *Emilia sonchifolia*.—Linn. Chin. pl. 144. Fl. hgk. 189. *Senecio sonchifolius*. Moench.

327. *Cineraria repanda*. Canton. Sin: *cau li man* (九里明). 613.

D. C. VI. 363. *Senecio chinensis*.

328. *Gorteria setosa*. Linn. Canton. Lour. 620.

D. C. VI. 501. *Gorteria*? *Loureiri*. Dubia.

329. **Xeranthemum chinense**. Lour. Canton. Sin: *siao louc ngi*. 608.

D. C. VI. 529. Stirps dubia.

330. *Carduus lanceolatus*. Linn. Canton. Sin: *la ti tsao*, *siao ky* (小薊). Lour. 588.

D. C. VI. 629. *Carduus chinensis*. Stirps dubia.

331. *Carduus tuberosus*. Linn. Canton. Sin: *thu gin sen* (土人參). Lour. 589.

D. C. VI. 645. *Cirsium pratense*. Linn.'s plant is a native of Europe.

332. *Serratula multiflora*. Linn. Canton. Sin: *mu min fo*. Lour. 589.

D. C. VI. 675. Linn.'s plant is probably *Jurinaea linearifolia*. Siberia, Caucasus. Tauria.

333. *Serratula scordium*. Lour. China, Cochin. spont. cult. Sin: *tse lan* (澤蘭). 590.

D. C. VI. 671. Dubia.

334. *Carthamus tinctorius*. Linn. China, Cochin. cult. Sin: *hum lan hoa* (紅藍花). Lour. 587.

Largely cultivated in China.

335. *Tussilago Anandria*. Linn. China borealis. Sin: *lu chau koan tum hoa* i.e. *koan tum hoa* (款冬花) from *lu chau* (in the prov. of An hui.). Lour. 614.

D. C. VII. 40. Linn.'s plant is *Anandria Bellidiastrum*, var. *autumnale*. (Gerbera. G. Pl. II. 498.)

336. *Cichorium Endivia*. Linn. China boreal. Sin: *khu tsai* (苦菜). Lour. 583.

D. C. VII. 84. Europa, India.

337. *Picris repens*. Lour. Canton. Sin: *hu hoam lien* (胡黃連). 583.

D. C. VII. 159. *Barkhausia repens*. Spr.—Hook. et Arn. bot. Beech. p. 194.—*Crepis repens*. G. Pl. II. 513.

338. *Leontodon sinense*. Lour. China. Sin: *pu cum tsao*. (蒲公英). 584.

D. C. VII. 150. *Taraxacum sinense*. Species non satis nota. In Peking *Leontodon taraxacum*, found also in Hongkong, bears the above Chinese name.

339. *Lactuca sativa*. Linn. Cochin. Macao. cult.—Sin: *ye tsai, kiu* (苣). Lour. 585.

The common Lettuce is cultivated throughout China.

340. *Sonchus floridanus*. Linn. Canton. Sin: *nieu li soi*. Lour. 586.

D. C. VII. 249. *Mulgedium floridum*. American spec.—G. Pl. II. 525. *Lactuca florida*.—According to Parker *Lactuca brevirostris* in Canton is 牛蒡草 *niu li tsao*.

341. *Sonchus sibiricus*. Linn. Canton. Sin: *xan tu* (山茶). Lour. 586.

D. C. VII. 249. *Mulgedium sibiricum*. Less. (*Lactuca sibirica*. G. Pl.). Siberia.

342. *Lobelia chinensis*. Lour. Canton. Sin: *puen fuen lien*. 628.

Fl. hgk. 197. *Lobelia trigona*. Roxbg. var. *glabra*. Osb. 145. \*

343. *Enkianthus quinqueflora*. Lour. Canton. cult. Sin: *tsiao tsung hoa* (吊鐘花). 339.

Fl. hgk. 200.



344. **Enkianthus biflora**. Lour. Canton. Sin: *san lieo hoa*. Lour. 340.

345. *Thela alba*. Lour. China, Cochin. Sin: *pa hoa tan*. (白花藤). 147.

D. C. XII. 692. **Plumbago ceylanica**. Linn.—Hce. Add. Fl. hgk. 111.

346. *Thela coccinea*. Lour. China, Cochin. Sin: *che hoa tan*. (赤花藤). 147.

D. C. XII. 693. **Plumbago coccinea**. Boiss. Observed in Macao by Vachell.

347. **Primula sinensis**. Lour. In imper. Sinensi. Sin: *yu tsuan hoa*. 128.

Not to be confounded with *Pr. sinensis*. Lindl. D. C. VIII. 35. *P. Sinensis* Lindl. has lately been observed by Watters in the province of Hupeh. (Journ. Bot. 1880. p. 262).

348. **Sideroxylon cantoniense**. Lour. In suburb. Canton. Sin: *san cot* (山欖). 151.

349. **Euclea herbacea**. Lour. Canton. Sin: *xe lin tsu*. 773.

D. C. VIII. 219. Species dubia.

350. *Ebenoxylum verum*. Lour. Cochin. Sin: *o mouc* (烏木), *u muen mu* (烏楠木). 752.

Osborne. 146. D. C. VIII. 242. **Maba Ebenos**. Spreng.

351. **Diospyros Kaki**. Linn. fil. China, Cochin. cult. Sin: *su xu* (柿樹). Lour. 278.

Cultivated throughout China.

352. *Myrtus chinensis*. Lour. Canton. Sin: *tan quat xiong*. 382.

D. C. III. 242. Specim. Lour. in lib. Mus. Paris. **Symplocos sinica** Ker? China.

353. *Nyctanthes grandiflora*. Linn. China, Cochin. cult. Sin: *ta mo li* (大茉莉). Lour. 26.

D. C. VIII. 302. **Jasminum Sambac**, var. *trifoliatum* or 303. **Jasm. arborescens**. Roxbg. (Lour.'s plant, non Linn.). But according to Parker *Jasminum grandiflorum* is also cultivated in Canton.

354. *Nyctanthes Sambac*. Linn. In hortis Chinae et Cochin. Sin: *mo li hoa* (茉莉花). Lour. 25.

D. C. VIII. 301. **Jasminum Sambac**. Ait.—Much cultivated in China.

355. **Jasminum officinale**. Linn. Canton. Sin: *su han hoa* (素馨花). Lour. 24.

Cultivated in South-China.—Hook. et Arn. bot. Beech. 197.

356. *Osmanthus fragrans*. Lour. In hortis Chinae, Cochin. Sin: *mo si hoa* (木犀花), *guei hoa* (桂花). Lour. 35.

*Olea fragrans*. Thbg. Japan.—Osborne. 149.—Cultivated throughout China, and also wild.

357. **Ligustrum sinense.** Lour. Canton. 23.

Fl. hgk. 215.—Decaisne Monogr. Ligustr. 36.—Introduced into Europe by Fortune. Gardener's Chron. 1878. 364.

358. **Vinca rosea.** Linn. China, Cochin. agrest. cult. Lour. 146.

Fl. hgk. 220.

359. *Plumeria obtusa.* Linn. China, Cochin. cult. Lour. 144.

D. C. VIII. 392. Lour.'s plant (non Linn.) *Plumeria acutifolia.* Poir. Southern Asia.

360. *Nerium Oleander.* Linn. China, Cochin. Lour. 141.

Hook. et Arn. bot. Beech. 199. Lour.'s plant is *Nerium odorum.* Linn.—Comp. Linn. Chin. pl. 150.

361. *Pergularia divaricata.* Lour. China. Sin: *hu muon.* 210.

D. C. VIII. 418. *Strophanthus divergens.* Grah.—Fl. hgk. 220.

362. **Apocynum alterniflorum.** Lour. Prope Cantonem. Sin: *fu muon than.* 209.

D. C. VIII. 440. Stirps dubia.

363. *Asclepias Curassavia.* Linn. Canton. Sin: *yong co lai* (羊角麗 Williams). Lour. 211.

D. C. VIII. 572. Lour.'s plant is *Toxocarpus Wightianus.* Hook. et Arn. bot. Beech. 200. But *Ascl. curassavia* has also been observed in South-China. Fl. hgk. 225. 224.

364. *Cynanchum inodorum.* Lour. Sin: *ti yong than.* 207.

D. C. VIII. 551. *Gymnema inodorum.*

365. *Cynanchum odoratissimum.* Lour. Canton. Cochin. cult. 206.

D. C. VIII. 618. *Pergularia odoratissima.* L.—Cultivated throughout China.

366. *Pergularia sinensis.* Lour. China. Sin: *fi si than.* 211.

Spreng. Syst. I. 836. *Periploca sinensis.*

367. *Stapelia chinensis.* Lour. Canton. Sin: *yong sau khau* (王綉球). 205.

D. C. VIII. 636. *Hoya carnos.* R. Br.—Fl. hgk. 228.—Bridgm. Chrest. 454, 46.—Comp. also Maxim. Diagn. pl. nov. asiat. I. 822. *H. chinensis.* Traill.

368. **Buddleia asiatica.** Lour. Cochin. 90.

Fl. hgk 231.

369. *Gentiana aquatica.* Linn. Canton. Sin: *xi kam xiong.* Lour. 214.

D. C. IX. 108. Lour.'s plant is a new sp. *Gentiana Loureiri.* Giesel.

370. **Hydrolea inermis.** Lour. Canton. Sin: *xiong fung.* 214.

371. *Varronia sinensis*. Lour. In var. locis imp. Sinensis. Sin: *xan chu yu* (山菜萸). 171.

D. C. IX. 500. *Cordia Loureiri*. Roem. et Sch. Non satis nota.

372. *Heliotropium indicum*. Linn. Coch. cult. Lour. 126.

Fl. hgk. 235.

373. *Anchusa officinalis*. Linn. In var. locis imp. Sinensis. Sin: *tsu tsao* (紫草). Lour. 127.

D. C. X. 42. Europa.—The above Chinese name is applied in Japan to *Lithospermum officinale*. L. var. *erythrorizon*. Maxim. Dec. XI. 541. The Chinese plant of the same name (the roots of it are sold in Peking) is probably the same.

374. *Echium vulgare*. Linn. Lour. 125.

D. C. X. 18. Europa.—

375. *Argyrea arborea*. Lour. China, Coch. spont. cult. Sin: *truong xuen hoa*. 167.

376. *Argyrea acuta*. Lour. In. Sinis. Sin: *pa ho than*. 167.

D. C. IX. 333. Specim. Lour. in hb. Mus. Britan.—Fl. hgk. 137.

377. *Ipomoea Quamoclit*. Linn. China, Coch. cult. Sin: *kam peng sung*. (錦屏松). Lour. 137.

D. C. IX. 336. India orient. America.—Osb. 154.—Much cultivated in China. Bridgm. Chrest. 454. 52.

378. *Convolvulus Pes caprae*. Linn. China, Coch. 134.

Osb. 155.—D. C. IX. 349. *Ipomoea pes caprae*. Sw.—Fl. hgk. 238.

379. *Convolvulus medium*. Linn. Coch. Lour. 130.

D. C. IX. 353. Lour.'s plant is *Ipomoea filicaulis*. Bl.—Fl. hgk. 238.

380. *Convolvulus reptans*. Linn. China, Coch. locis aquosis. Lour. 133.

D. C. IX. 349. *Ipomoea reptans*. Poir.—Osb. 153.—Cultivated throughout China.

381. *Convolvulus Batatas*. Linn. *Tubera esculenta*. India, China, Coch. Sin: *hoan xy* (紅薯). Lour. 131.

D. C. IX. 338. *Batatas edulis*. Chois.—G. Pl. II. 872. *Ipomoea Batatas*.—Osb. 152.—Cultivated throughout China.

382. *Convolvulus obscurus*. Linn.? China, Coch. Sin: *ca phan xy*. Lour. 131.

D. C. IX. 370. *Ipomoea obscura*. Ker.—Add. fl. hgk. 113.

383. *Convolvulus tomentosus*. Linn. China, Coch. Sin: *khien nieu* (牽牛). Lour. 133.

D. C. IX. 428. Linn.'s plant (non Lour.) *Pharbitis tomentosa*. Chois.—G. Pl. II. 871. *Ipomoea tomentosa*.—In Peking the above Chinese name is applied to *Pharbitis triloba*. Chois.—Osb. 157?

384. **Solanum Melongena.** Linn. China, Cochin. Sin : *kie tsu* (茄子). Lour. 161.  
Osborne. 160.—Largely cultivated in China.
385. **Solanum aethiopicum.** Linn. China, Cochin. cult. Lour. 160.  
D. C. XIII. 1. 351. Lour.'s plant is *S. aethiopicum*, var. *violaceum*.—Linn. Chin. 161.
386. **Solanum lycopersicum.** Linn. Cochin. Lour. 161.  
Cultivated in Peking.
387. **Solanum nigrum.** Linn. Cochin. Lour. 160.  
Fl. hgk. 242.—Frequent in North-China.
388. **Solanum biflorum.** Lour. China, Cochin. Sin : *thien phao* (天泡). 159.  
Osborne. 163.—Fl. hgk. 242.—Add. Fl. hgk. 242.
389. **Solanum indicum.** Linn. Cochin. Lour. 162.  
Osborne. 162.—Fl. hgk. 242.
390. **Solanum dichotomum.** Lour. Canton : *kam ngi van*. 160.
391. **Physalis Alkekengi.** Linn. China, Cochin. Sin : *scan tsiam* (酸漿). Lour. 164.  
D. C. XIII. i. 438. Europa, China.—Common in North-China.
392. **Physalis angulata.** Linn. Cochin. Lour. 164.  
Fl. hgk. 244.
393. **Capsicum annum.** Linn. Cult. China, Cochin. Lour. 157.  
Much cultivated in China.
394. **Capsicum baccatum.** Linn. Cult. China, Coch. Lour. 157.  
D. C. XIII. i. 420. India, America.
395. **Capsicum frutescens.** Linn. China, Cochin. cult. Sin : *lat tsiao* (辣椒). Lour. 158.  
Osborne. 164.
396. *Lycium barbarum.* Linn. Canton. Sin : *keu ki* (枸杞). Lour. 165.  
D. C. XIII. 1. 510. Lour.'s plant is *Lycium chinense*. Mill.—Osborne. 165.—Fl. hgk. 245.
397. **Datura Metel.** Linn. China, Cochin. Sin : *nao hien hoa* (鬧陽花). Lour. 135.  
The above Chin. name is applied in Canton to *Datura alba*. Nees. (Parker.)
398. **Nicotiana fruticosa.** Linn. China. Cochin. Sin : *yen ye* (煙葉). Lour. 136.  
Osborne. 168.



399. *Antirrhinum Linaria* Linn. Canton. Sin : *soy kue hoa*.  
Lour. 465.

D. C. X. 273. *Linaria vulgaris*. Mill. Europa, Asia bor.—Also in North-China.

400. *Antirrhinum spurium*. Linn. Canton. Lour. 465.

D. C. X. 268. *Linaria spuria*. Mill. Europa, Asia occid.

401. **Mazus rugosus**. Lour. Cochin. 468.

Fl. hongk. 247.—Also in North-China.

402. *Digitalis sinensis*. Lour. 459.

D. C. X. 380. *Pterostigma grandiflorum*. Benth. ?—G. Pl. II. 449  
*Adenosma grandiflorum*.—Osborne. 170.—Fl. hgk. 247.

403. *Septas repens*. Lour. Canton. Sin : *pa tsi hien* (巴戟天). 477.

D. C. X. 400. *Herpestis Monnieria*. Humb. B. —Fl. hgk. 249.

404. **Gratiola hyssopioides** ? Linn. Canton. Sin : *pi pa tsao*. Lour. 27.

D. C. X. 415. India.

405. *Picria Fel terrae*. Lour. China, Cochin. cult. Lour. 478.

G. Pl. II. 954. Specim. Lour. in hb. Mus. Brit. *Curangae* Species ?

406. *Ruellia antipoda*. Linn. Cochin. Lour. 462.

Osborne. 174.—D. C. XI. 155. *Bonnaya veronicaefolia*. Spreng. Fl. hgk. 252.

407. **Scoparia dulcis**. Linn. Cochin. Lour. 89.

Fl. hgk. 252.

408. *Striga lutea*. Lour. Canton. Sin : *thoc chio kam* (獨腳金. Parker.). 27.

Fl. hgk. 254. *Striga hirsuta*. Bth.—D. C. X. 502.

409. *Campsis adrepens*. Lour. In sylvis prov. Canton. Sin : *lien sieu* (陵霄). 458.

D. C. IX. 223. *Tecoma grandiflora*. Delaun.—Loureiro in stating that this plant has bipinnate leaves, commits the same error as with respect to *Sophora japonica*. (166 above.)

410. **Sesamum orientale**. Linn. China, Cochin. Sin : *ma chi* (麻脂). Lour. 464.

Largely cultivated in China.

411. *Acanthus ilicifolius*. Linn. China, Cochin. Sin : *lao chu lac* (老鼠芳). Lour. 455.

D. C. XI. 269. Lour.'s plant *Dillivaria ebracteata*. Juss. ? India orient.

412. **Barleria procumbens**. Lour. Canton. Sin : *kam kua tsu* 458.

D. C. XI. 243. Incertae sedis.

413. *Justicia chinensis*. Linn. Cochin. Lour. 30.

Linn. Chin. pl. 183.—Fl. hgk. 266. *Dieliptera chinensis*. Nees.

414. *Justicia purpurea*. Linn. Canton. Sin: *chi chap hoa*.  
Lour. 31.

Osb. 181.—D. C. XI. 493. *Peristrophe tinctoria*. Nees.—Journ. bot. 1879.  
13. Hainan (Hance). Observed also near Kiukiang.

415. ***Dissolena verticillata***. Lour. Provincia Canton.  
Sin: *mat sa*. 171.

D. C. VIII. 318. *Verbenacea*.

416. *Phyla chinensis*. Lour. Sin: *lien fuen*. 83.

D. C. XVII. 296. *Verbena nodiflora*. Linn. *Lippia nodiflora*. Rich.  
Osb. 184.

417. ***Verbena officinalis***. Linn. China, Cochin. Sin: *ma  
pien tsao* (馬鞭草 Parker.). Lour. 33.

Fl. hgk. 268.

418. *Porphyra dichotoma*. Lour. Canton. Sin: *tsu hoa uon* 87.

D. C. XI. 645 *Callicarpa purpurea*. Juss. China, Japan.

419. ***Vitex Negundo***. Linn. China, Cochin. Sin: *muen  
kim* (蔓荆). Lour. 474.

Osb. 185.—Fl. hgk. 273.

420. ***Vitex trifolia***. Linn. China, Cochin. Lour. 474.

Fl. hgk. 273.—D. C. XI. 683. Collected near Canton by Millet and  
Vachell.

421. ***Vitex spicata***. Lour. China, Cochin. Sin: *u chu  
kim*. 475.

D. C. XI. 696. Dubia.

422. *Cornutia quinata*. Lour. Canton. Sin: *u si kam* (五指  
金). 470.

Fl. hgk. 273. *Vitex Loureiri*. Hook. et Arn. bot. Beech. 206.—The above  
Chin. name is applied in Canton also to *V. Negundo*. (Parker.)

423. ***Clerodendron infortunatum***. Linn. Canton. Sin:  
*fung mi chu*. Lour. 471.

D. C. XI. 667. India orientalis.

424. *Volkameria Petasites*. Lour. Cochin. 473.

D. C. XI. 657. *Clerodendron infortunatum*. Linn.

425. *Volkameria inermis*. Linn. Canton. Sin: *san fu mun*.  
Lour. 471.

D. C. XI. 660. *Clerodendron inerme*. R. Br.—Osb. 187.—Fl. hgk. 271.

426. *Volkameria pumila*. Lour. Canton. Sin: *san tang lung*  
(山燈籠). 472.

D. C. XI. 674. *Clerodendron pumilum*. Spreng.

427. *Barbula sinensis*. Lour. Canton. Sin: *sat song kim* 445.

Fl. hgk. 269. *Caryopteris mastacanthus*. Schau.—D. C. XI. 625.

428. ***Ocimum Basilicum***. Linn. Cochin. cult. Lour. 449.  
Much cultivated in China.

429. *Dentitia nankinensis*. Lour. Nanking. Canton. Sin : *kiam nan tsu su* (江南紫蘇). 448.

Fl. hgk. 276. *Perilla ocymoides*. L. var. *crispa*.

430. *Mentha pulegium*. Linn. China, Cochin. Sin : *po ho* (薄荷). Lour. 437.

Lour.'s plant is probably *Mentha arvensis*. L. (*M. javanica* Bl). Fl. hgk. 276. The above Chin. name is applied in Peking to *M. arvensis*, var. *sativa*.

431. *Mentha hirsuta*. Linn. China, Cochin. Sin : *hiam tsao* (香草). Lour. 437.

D. C. XII. 170. European spec.

432. *Mentha crispa*. Linn. China, Cochin. Lour. 437.

D. C. XII. 170. Europa.

433. *Origanum creticum*. Linn. Canton. Sin : *Quam tum kim kiai*. Lour. 453.

D. C. XII. 193. *Origanum vulgare*. L. var. *prismaticum*. Europa.

434. *Origanum heracleoticum*. Linn. China, Cochin. Lour. 453.

D. C. XII. 194. Linn.'s plant is dubious. *O. hirtum*. Link? Europa.

435. *Origanum Majorana*. Linn. China. Cochin. raro. Lour. 454.

D. C. XII. 195. 196. Ind. orient.

436. *Origanum Dictamnus*. Linn. Canton. Sin : *quam tum fam fum* (廣東防風). Lour. 452.

D. C. XII. 191. Europa.

437. *Melissa cretica*. Linn. China, Cochin. cult. Sin : *tsu su* (紫蘇). Lour. 446.

D. C. XII. 227. *Calamintha cretica*. Benth. Creta.—In Peking the above Chin. name is applied to *Perilla ocymoides*. L.

438. *Rosmarinus officinalis*. Linn. China, Cochin. cult. Sin : *yong tsao*. Lour. 34.

D. C. XII. 360. Europa. Oriens.

439. *Betonica officinalis*. Linn? China, Cochin. cult. Sin : *ho hiam* (藿香) Lour. 441.

D. C. XII. 460. Europa. Asia bor.—In Peking the above Chinese name is applied to *Lophanthus rugosus*. Fisch.

440. *Stachys Artemisia*. Lour. China, Cochin. Sin : *ke hoei, sung uy*. Lour. 443.

D. C. XII. 501. *Leonurus sibiricus*. Linn.—Linn. Chin. pl. 194. Fl. hgk. 278.

441. *Lamium garganicum*. Linn. China, Cochin. Sin : *hi kiem tsao*. Lour. 442.

D. C. XII. 504. Europa.

442. **Teucrium Polium.** Linn. Canton. Sin : *ti tam tsao*.  
Lour. 439.

D. C. XII. 591. Europa, Africa, Asia occid.

443. **Ajuga reptans.** Linn. Canton. Lour. 441.

D. C. XII. 595. Europa. Asia occid.

444. **Plantago major.** Linn. Ad vias. China, Cochin. Sin :  
*che tsien ts'ao* (車前草). Lour. 90.

Fl. hgk. 280.—Linn. Chin. 195—Roem. et Sch. syst. III. 112. consider  
Lour.'s plant a new spec : *P. Loureiri*.

445. **Campylus sinensis.** Lour. Canton, in collibus nemo-  
rosis. Sin : *xeng con than*. Lour. 140.

D. C. XVII. 291. Corolliflora incertae sedis.

446. **Callicarpa triloba.** Lour. China, Cochin. Sin : *ca fu*  
*thay* 89.

D. C. XI. 647. Dubia.

447. **Mirabilis Jalappa.** Linn. China, Cochin. Sin : *jen*  
*chi hoa* (胭脂花). Lour. 123.

Osb. 196.

448. **Boerhavia diffusa.** Linn. Canton. Sin : *houng si sin*  
Lour. 20.

Fl. hgk. 281. Canton.

449. **Celosia argentea.** Linn. China, Cochin. cult. agr.  
Sin : *tsim siam tsu* (青箱子). Lour. 203.

Osb. 198.—Fl. hgk. 284.

450. **Celosia margaritacea.** Linn. Cochin. in China cult.  
Sin : *hia khu tsao* (夏枯草). Lour. 203.

D. C. XIII. 2. 243. *C. argentea*, var. *margar.*

451. *Celosia castrensis* Linn. China, Cochin. cult. Sin : *ki*  
*koan hoa* (雞冠花). Lour. 202.

Osb. 199.—Fl. hgk. 284.—D. C. XIII. 2. 242. *Celosia cristata*. var  
*castrensis*.

452. **Amaranthus tristic.** Linn. China, Cochin. escu-  
lenta. Lour. 686.

Osb. 201.

453. **Amaranthus spinosus.** Linn. Cochin. spont. cult.  
Lour. 687.

Fl. hgk. 285.

454. **Amaranthus cruentus.** Linn. China, Cochin. cult.  
Lour. 687.

Osb. 200.

455. **Amaranthus tricolor.** Linn. China, Cochin. cult.  
Sin : *hum hien* (紅莧). Lour. 685.

Frequently cultivated in China.



456. *Amaranthus polygamus*. Linn. China, Cochin. cult. spont. Sin: *pe hien* (白莧). Lour. 685.

D. C. XIII. 2. 272. *Euxolus polygamus*. Mocq. Aegyptus, Amboina.

457. *Cyathula geniculata*. Lour. Cochinchina, China? Sin: *nieu si* (牛膝). Lour. 124.

D. C. XIII. 2. 326. *Cyathula prostrata*. Bl. Macao (Callery). Fl. hgk. 285.

458. *Illecebrum sessile*. Linn. Canton. Sin: *fan ti kouc* (蟛蜞菊 Parker.). Lour. 202.

D. C. XIII. 2. 357. *Alternanthera sessilis*. R. Br. China. (Staunton). Fl. hgk. 285.

459. *Gomphrena globosa*. Linn. China, Cochin. cult. Lour. 218.

Osborne. 205.—D. C. XIII. 2. 409. China (Leclanch.).—Cultivated in Peking.

460. *Beta vulgaris*. Linn. Canton cult. Sin: *pa hung*. Lour. 217.

Much cultivated in Peking and other parts of China.

461. *Spinacia oleracea*. Linn. Canton, cult. Lour. 757.

Osborne. 206.—Cultivated throughout China.

462. *Basella nigra*. Lour. China, Coch. agrest. cult. Sin: *lo quei* (落葵). 229.

Willdenow thinks, that this is *Basella rubra*. Linn. But D. C. XIII. 2. 223. retains Lour.'s spec. as distinct.

463. *Lagunea cochinchinensis*. Lour. China, Cochin. Sin: *pa niu*. Lour. 272.

D. C. XIV. 123. *Polygonum orientale*. Linn.—Osborne. 211.—Fl. hgk. 288.

464. *Polygonum chinense*. Linn. Canton. Sin: *fo than mu*. (火炭毛 Parker). Lour. 297.

Osborne. 212.—Fl. hgk. 289.

465. *Polygonum barbatum*. Linn. China, Canton. Sin: *leao xi* (蓼?), *hung hoang xeng*. Lour. 296.

Osborne. 210.—Fl. hgk. 288.

466. *Polygonum tinctorium*. Lour. Canton. Sin: *ho lam* (小藍). 297.

Act. hort. Kew. 2d ed. II. 418. Introduced into England from China, in 1776.—Cultivated in North-China

467. *Polygonum hydropiper*. Linn. China, Cochin. Sin: *xuei leao* (水蓼). Lour. 295.

D. C. XIV. 107. *Polygonum flaccidum*? (Lour.'s plant.). But *P. hydropiper* is found in Hongkong. Fl. hgk. 288.

468. *Polygonum ciliatum*. Lour. Canton. Sin: *ho xan kio*. 299.

D. C. XIV. 102. Species obscura.

469. **Polygonum perfoliatum**. Linn. Cochin. Lour. 298.  
Fl. hgk. 289.
470. *Polygonum aviculare*. Linn. China, Cochin. Sin: *vien suc* (篇蓄). Lour. 297.  
D. C. XIV. 93. *Pol. Roxburghii*. var.—Fl. hgk. 287. *Pol. plebejum*. Br.
471. **Polygonum tataricum**. Linn. Canton. Sin: *tam co mac* (? 蕎麥). Lour. 298.  
D. C. XIV. 144. Tataria, Sibiria, Nepal.—Found also in North-China.
472. **Rheum palmatum**. Linn. China borealis. Sin: *ta hoam* (太黃). Lour. 313.  
Lin. Chin. pl. 213.
473. *Rheum Rhabarbarum*. Linn. In multis locis imp. Sin. colitur. Sin: *ta hoam*. Lour. 314.  
**Rheum undulatum**. Linn. Chin. pl. 214.
474. *Rumex crispus*. Linn. Cochin. Lour. 269.  
D. C. XIV. 60. Lour.'s plant is *Rumex chinensis*. Campd. Gathered in China by Staunton, Beechey, Millet.—Add. Fl. hgk. 117.
475. *Asarum virginianum*. Linn. In variis Sinarum provinciis. Sin: *Si sin* (細辛). Lour. 357.  
Lour. quotes Thbg. Japan. Thbg.'s *Asar. virg.* is *Asarum Thunbergii*. Al. Braun. D. C. XV. 1. 427.
476. *Spathium chinense*. Lour. Canton. Sin: *thong pin ngau*. Lour. 270.  
Hook. et Arn. bot. Beech. 216 identify it with *Saururus cernuus*. L. S. China,—Decaisne (D. C. XVI. 1. 239.) makes a new spec. *Saururus Loureiri*.
477. *Polypara cochinchinensis*. Lour. Cochin. cult. Lour. 78.  
D. C. XVI. 1. 238. *Houttuynia cordata*. Thbg.—Fl. hgk. 334.
478. **Piper nigrum**. Linn. Cochin. Sin: *hu tsiao* (胡椒). Lour. 37.
479. **Piper Betle**. Linn. Sin: *lau yep* (蓏葉). Lour. 39.  
Osborne, 216.
480. **Piper longum**. Linn. Sin: *pi po* (草撥). Lour. 40.
481. *Creodus odorifer*. Lour. Cochin. cult. 112.  
D. C. XVI. 1. 474. *Chloranthus inconspicuus*. Sw. ?—Fl. hgk. 334.
482. *Laurus Camphora*. Linn. China. Japan. Sin: *lum nao hiam* (龍腦香). Lour. 306.  
Osborne, 217.—D. C. XV. 1. 24. *Cinnamomum Camphora*. Nees. China (Staunton).
483. *Laurus Cinnamomum*. Linn. Cochin. Sin: *kuei xu* (桂樹). Lour. 305.  
D. C. XV. 1. 16. Lour.'s plant is *Cinnamomum Loureiri*. Nees. Found also in Japan.

484. *Sebifera glutinosa*. Lour. China, Cochin. Sin : *cien kam xu*. Lour. 783.  
D. C. XV. 1. 178. *Tetranthera laurifolia*. Jacq. *Litsaea chinensis* Lam.—Fl. hgk. 293. *Tetranthera citrifolia*.—Add. Fl. hgk. 119.
485. *Glabraria Tersa*. Linn. Cochin. Lour. 576.  
D. C. XV. 1. 179. *Tetranthera laurifolia*, var. *citrifolia*.—Fl. hgk. 293.—Add. Fl. hgk. 119.
486. *Laurus Cubeba*. Lour. China, Cochin. cult. 310.  
D. C. XV. 1. 199. *Tetranthera*? *Cubeba*.—*Daphnidium Cubeba*. Nees.
487. *Laurus Sassafra*. Linn. Prope Tunkin. Sin : *hoam cham* (黃樟). Lour. 312.  
D. C. XV. 1. 246. *Lindera*? *Loureiri*. Bl. Species dubia.
488. *Laurus Myrrha*. Lour. Cochin. Sin : *u yo* (烏藥). 308.  
D. C. XVI. 1. 230. *Daphnidium Myrrha*. Nees.—G. Pl. III. 163. *Lindera Myrrha*.
489. *Calodium cochinchinense*. Lour. Cochin. China? 303.  
Willdenow thinks, that it may be *Cassyta filiformis*. L.—Osborn. 218.—Fl. hgk. 294.
490. ***Helicia cochinchinensis***. Lour. Cochin. 105.  
Fl. hgk. 295.
491. *Daphne odora*. Linn. Canton. cult. Sin : *nhuc moi, nun mui*. Lour. 292.  
D. C. XIV. 537. Lour.'s plant : *Daphne sinensis*. Lam. Has been cultivated in Paris.
492. ***Daphne triflora***. Lour. Canton. Sin : *u si seng*. 291.  
D. C. XIV. 541. 537. (*D. japonica*).
493. *Daphne cannabina*. Lour. Cochin. 291.  
D. C. XIV. 546. *Wickstroemia viridiflora*. Meissn. Specim. Lour. in hb. Mus. Paris.—Fl. hgk. 297.
494. *Daphne indica*. Linn. Nanking, Canton. Sin : *lu ha sin*. Lour. 292.  
D. C. XIV. 543. *Wickstroemia indica*. C. A. Mey. China (Vachell).—Osborn. 219.
495. *Ophispermum sinense*. Lour. Sin : *pa mou yong*. 344.  
G. Pl. III. 200. *Aquilaria* spec.
496. *Elaeagnus latifolia*. Linn. Canton. Sin : *pa poi tsu*. Lour. 113.  
D. C. XIV. 613. *Elaeagnus Loureiri*. Champ.—Fl. hgk. 298.
497. ***Santalum album***. Linn. South-Cochinchina. Sin : *tan yam*. (檀香). Lour. 109.  
D. C. XIV. 683. India, Indian Archipelago.
498. ***Euphorbia nereifolia***. Linn. Cochin. Lour. 366.  
Osborn. 222.—D. C. XV. 2. 79. Ceylon.
499. ***Euphorbia Tirucalli***. Linn. Cochin. Lour. 366.  
Fl. hgk. 301.

500. **Buxus sempervirens**. Linn. China, Cochin. Sin: *luam tuon*. Lour. 678.

Fl. hgk. 315. *B. sempervirens*. But Hance Add. Fl. hgk. 123 considers this a new spec: *Buxus Harlandi*.

501. *Clusia monoica*. Lour. Canton. Sin: *xun ti fum*. 784.

D. C. XV. 2. 508. **Cleistanthus monoicus**.—Hook. et Arn. bot. Beech. 211.—Species incomplete nota.

502. **Phyllanthus Emblica**. Linn. China. Cochin. Sin: *hac min san* (黑面辰). Lour. 677.

D. C. XV. 2. 352. India orient., China (Staunton), Japan.—Fl. hgk. 312.—The above Chin. name = *Melanthesa chinensis* in Canton. (Parker). Also *Phyllanthus obscurus*.

503. *Nymphanthus chinensis*. Lour. Canton. Sin: *siong chu tsao* (珍珠草). 664.

D. C. XV. 2. 433. **Phyllanthus villosus**. Poir. China (Sonnerat.) In Canton the above Chin. name = *Phyll. urinaria* (Parker.).

504. *Nymphanthus Niruri*. Lour. Cochin. 665.

D. C. I. c. 406. **Phyllanthus Niruri**. Müll. (Specim. Lour. in hb. Mus. Lond.).—Fl. hgk. 311.

505. **Phyllanthus urinaria**. Linn. Canton, Cochin. Sin: *fi yong tsao* (飛陽草). Lour. 677.

D. C. I. c. 364. Müller refers, evidently by a mistake, Lour.'s Ph. Niruri both to Ph. Niruri and to Ph. urinaria, which however he describes as distinct species.—Fl. hgk. 310.—The above Chin. name in Canton *Euphorbia pilulifera* L. (Parker.).

506. *Cathetus fasciculata*. Lour. Cochin. 746.

D. C. I. c. 350. **Phyllanthus fasciculatus**. Müll. (Lour. specim. in hb. Mus. Lond.). Fl. hg. 311.

507. **Antidesma scandens**. Lour. Canton. Sin: *u chao lum* (五瓜龍). 757.

D. C. I. c. 268. Dubia.

508. *Vernicia montana*. Lour. Cochin. China. Sin: *tong xu* (桐樹). 721.

D. C. I. c. 724. **Aleurites cordata**. Müll. China (Gaudich.), Japan (Kaempfer). *Elaeococca vernicia*. Adr. Juss.

509. *Juglans Camirum*. Lour. Cochin. cult. spont. 702.

D. C. I. c. 723. **Aleurites triloba**. Forst. China (in hb. Lambert.), Philippin., Ind. orient.

510. **Croton Tiglium**. Linn. China, Cochin. Sin: *pa teu* (巴豆). Lour. 714.

D. C. I. c. 600. India, Ceylon, Philipp.

511. **Croton aromaticum**. Linn. Canton. Sin: *pa teu yong* (巴豆香)

D. C. I. c. 588. India orient.



512. **Croton congestum**. Lour. Canton. Sin: *pa teu* (巴豆). 714.

513. *Tridesmis tomentosa*. Lour. Canton. Sin: *ca xi ma* 707.

D. C. l. c. 588. *Croton tomentosus*. Müll. **Croton crassifolium**. Geisel. *Croton chinense*. Bth. Fl. hgk. 309, (specim. in hb. Mus. Paris.) Osb. 226.

514. *Tridesmis hispida*. Lour. Canton. Sin: *ki quat yong*. 706.

D. C. l. c. 1256. Species *Crotonis*.

515. *Phyllaurea Codiaeum*. Lour. China, Cochin. cult. 705.

D. C. l. c. 1120. *Codiaeum variegatum*. Linn. Ins. Molucc.

516. *Jatropha Janipha*. Linn. China. Sin: *pe fu tsu* (白附子). Lour. 718.

D. C. l. c. 1073. Lour.'s plant is *Manihot Loureiri*. Pohl.

517. *Urtica gemina*. Lour. Cochin. 682.

D. C. l. c. 866. *Acalypha gemina*. Spreng. *A chinensis* Roxb.—Hook. et Arn. bot. Beech. 213.—Also in N. China.

518. *Ricinus apelta*. Lour. Canton. Sin: *xan pe xu*. 718.

D. C. l. c. 963. *Mallotus apelta*. Müll.—*Rottlera chinensis*. Adr. Juss. (specim. Lour. in hb. Mus. Paris.) Fl. hgk. 306.

519. **Ricinus communis**. Linn. China, Cochin. cult. incult. Sin: *pi ma* (蓖麻). Lour. 716.

Fl. hgk. 307.—Cultivated throughout China.

520. *Triadica sinensis*. Lour. Canton. Sin: *u khau mo* (烏桕木). 749.

D. C. l. c. 1210. *Excoecaria sebifera*. Müll. *Stillingia sebifera*. Mich.—Osb. 227.—Fl. hgk. 302.

521. **Excoecaria cochinchinensis**. Lour. cult. China, Cochin. 750.

D. C. l. c. 1215. Ceylon, India orient., China. Specim. Lour. in hb. Mus. Lond.

522. *Commia cochinchinensis*. Lour. Cochin. 743.

D. C. l. c. 1220. *Excoecaria Agallocha*. Müll. Ind. orient., Philipp., Nov. Holland. (Specim. Lour. in hb. Mus. Lond.)

523. **Cannabis sativa**. Linn. China. Sin: *ma fuen* (麻黃). Lour. 756.

Frequent in North-China and also in other parts of the Empire.

524. *Streblus cordatus*. Lour. Canton. Sin: *tsong xu*. 755.

D. C. XVII. 219. *Broussonetia papyrifera*. Vent.

525. **Morus alba**. Linn. China, raro in Cochin. Sin: *xin pe xu* Lour. 678.

Linn. Chin. pl. 231.—Cleyer med. Sin. 290. *Cortex Morisam pe pi* (桑白皮). This resembles somewhat the Chinese name quoted by Lour.

526. *Morus rubra*. Linn. Cochin. apud Mojos populos. Lour. 679.

D. C. XVII. Lour.'s plant is *Morus alba* var. *atropurpurea*. Bur. *Morus atropurpurea*. Roxb. Introduced into India from China.

527. *Morus indica*. Linn. Cochin. cult. Lour. 679.

D. C. l. c. 243. *Morus alba*, var. *indica*. Bur. Observed near Canton by Hedde. Also in Formosa. Cultivated in India.

528. *Dorstenia chinensis*. Lour. Prov. (boreal.) imp. Sinens. Sin: *pe chi* (白芷). 114.

D. C. XVII. 277. Dubia.

529. *Ficus carica*. Linn. Culta China, raro Cochin. Sin: *mao hoa qua* (無花果). Lour. 816.

Cultivated throughout China.

530. *Ficus Benjamina*. Linn. Cochin. Lour. 818.

Osb. 229?

531. *Ficus pumila*. Linn. Cochin. Lour. 820.

Linn. Chin. pl. 230.

532. *Polyphema Jaca*. Lour. Cochin. freq. cult. China raro. Sin: *ya xu, po lo mat* (波羅密). 667.

*Artocarpus integrifolia*. Linn. Comp. above Boym, Flora sin. 13. Swinhoe saw the tree cultivated in Hainan.

533. *Vanieria chinensis*. Lour. Provincia Canton. Sin: *hung hoang xiong*. 691.

G. Pl. III. 351. *Cudrania*? vel *Plecosperrum*?

534. *Urtica interrupta*. Linn. China, Cochin. Sin: *tam ma* Lour. 682.

D. C. XVI. 1. 74. *Fleurya interrupta*. Gaudich. India.

535. *Polychroa repens*. Lour. China, Cochin. cult. incult. 684.

G. Pl. III. 386. *Pellionia brevifolia*. Bth. Fl. hgk. 330?

536. *Urtica nivea*. Linn. China, Cochin. cult. Sin: *pa ma*. Lour. 683.

D. C. XVI. 1. 206. 207. *Boehmeria nivea*. Hook. et Arn. Osb. 252. Fl. hgk. 331.—Sin: (苧麻) *ch'u ma*.

537. *Parietaria cochinchinensis*. Lour. China, Cochin. Sin: *mao soi cot* (霧水葛). 804.

D. C. l. c. 220. *Pouzolzia indica*. Gaudich. var. *alienata*, Wedell.

538. *Juglans regia*. Linn. China borealis. Sin: *ho tao* (核桃). Lour. 702.

Much cultivated in North-China.

539. *Morella rubra*. Lour. China, cult. Cochin. agrest. Sin: *yam mui* (楊梅). 670.

G. Pl. III. 401. *Myrica sapida*. Wall species in India orient. Chinaque frequens sylvestris vel culta.—Fl. hgk. 322. *Myrica rubra*. Sieb. et Zucc. Very near to *M. sapida*.

540. **Quercus cornea**. Lour. China, Cochin. Sin: *chu* (茅). 700.

Flor. hbk. 322.

541. *Fagus Castanea*. Linn. Cochin. *sylvestris*, China colit. Sin: *lie tsu* (栗子). Lour. 699.

D. C. XVI. 2. 116. *Castanea chinensis*. Spreng.—*Castanopsis chinensis*. Hance. Journ. Linn. Soc. X. 199. He gathered this species in the Canton province.—According to D. C. XVI. 2. 116. Loureiro's *Fagus cochinchinensis* belongs to the same species.

542. **Salix babylonica**. Linn. Frequens China, colit. Cochin. Sin: *lieu xu*. (柳樹). Lour. 747.

A common tree in North-China.

543. *Juniperus barbadensis*. Linn. China. Lour. 781 and **J. chinensis**. Linn. *ibid*.

D. C. XVI. 2. 488. Both of these Loureirian plants are referred to *J. chinensis*. L.—D. C. quotes Hance *ins.* Hongkong (not found in Add. fl. hbk.).

544. **Thuja orientalis**. Linn. China, Cochin. raro colit. Lour. 712.

Osb. 233.—Cultivated throughout China. *Biota orientalis*. Endl.

545. **Cupressus sempervirens**. Linn. China spont. Cochin. cult. Sin: *pe xu* (栢樹). Lour. 711.

D. C. l. c. 468. Not quoted for China. In Peking the above Chin. name is applied to *Biota orientalis*.

546. *Cupressus thuyoides*. Linn. China, Cochin. Lour. 711.

D. C. l. c. 464. *Chamaecyparis sphaeroidea*. Spach. American plant.

547. *Pinus Abies*. Linn. China australis. Sin: *wan mo* (杉木). Lour. 710.

D. C. l. c. 432. *Cunninghamia sinensis*. R. Br.—Osb 235.—Fl. hbk. 337.

548. *Pinus sylvestris*. Linn. China, Cochin. Sin: *sum* (松). Lour. 709.

D. C. l. c. 389. *Pinus Massoniana*. Lamb. *P. sinensis*. Lamb. Fl. hbk. 337.—Add fl. hbk. 125. A common tree in all parts of China.

549 **Cycas inermis**. Lour. China, Cochin. spont. cult. 776.

D. C. l. c. 526. Culta in hort. Amstelod.

#### MONOCOTYLEDONS.

550. *Musa seminifera*. Lour. Cochin. cult. spont. Lour. 791.

*Musa odorata*. Lour. Cochin. cult. Lour. 791.

*Musa nana*. Lour. Cochin. 791.

*Musa corniculata*. Lour. Cochin. 791.

Desvaux in Journ. d. Bot. 1814 considers all these species only varieties of *Musa sapientum*. L.—Fl. hbk. 348.—Osb. 237.

551. *Musa uranoscopos*. Lour. Cochin. 792.  
Bot. Mag. tab. 1559. (1813). *Musa. coccinea*. Andr. introduced into Europe, from China, in 1792.
552. ***Canna indica***. Linn. China, Cochin. Sin : *san kiam* (山薑). Lour. 13.  
Osbeck. 239.—Fl. hgk. 349.
553. *Phyllodes placentaria*. Lour. China, Cochin. Sin : *toung yep* (冬葉). 17.  
Roem. et Schult. Syst. I 18. *Phrynium capitatum*. Willd. (Malabar, China).
554. *Amomum Galanga*. Lour. China, Cochin. cult. et agrest. Sin : *cao leam kiam* (高良薑). Lour. 7.  
*Maranta Galanga*. Linn. *Galanga major*. Rumph.—Linn. Chin pl. 240.—Fl. hgk. 348. *Alpinia Galanga*. Sw.
555. ***Amomum medium***. Lour. Provincia Yunnan imp. Sinensis. Sin : *tsao quo* (草菓). 5.  
Hanbury Science pap. 105. *Chinese ovoid Cardamom*. Known only from its fruits it seems.
556. ***Amomum globosum***. Lour. In montibus Chinae et Cochin. Sin : *tsao keu* (草豆蔻). 6.  
Hanbury, Science pap. 95. *Large round Chin. Cardamom*. The plant is unknown to modern botanists.
557. ***Kaempferia Galanga***. Linn. In hortis Chinae et Cochin. Sin : *san lay* (三辣). Lour. 15.  
Roem. et Sch. Syst. I. 27. India orient.
558. *Curcuma rotunda*. Linn. China, Cochin. frequens. Sin : *pum ngo meu* (蓬莪茂). Lour. 11.  
Spreng. Syst. I. 10. *Kaempferia pandurata*. Roxbg. Sumatra.
559. ***Curcuma longa***. Linn. Cochin. culta, inculta. Sin : *kiam hoam* (薑黃). Lour. 11.  
Flückiger and Hanbury, Pharmacographia. 577:] One sort of the Turmeric of commerce is China Turmeric.
560. ***Curcuma pallida***. Lour. Cochin. Canton. Sin : *san kiam hoam* (山薑黃). 12.
561. *Amomum Zingiber*. Linn. China, Cochin. cult. Sin : *sem kiam* (生薑). Lour. 2.  
Spreng. Syst. I. 12. *Zingiber officinale*. Rosc. India.—Without any doubt a native of China.
562. *Aristotelea spiralis*. Lour. Canton. Sin : *hoan lum*. 638.  
Spreng. Syst. III. 708. *Spiranthes amoena*. M. B., which according to Ledebour Fl. ross. IV. 184. is *Spiranthes australis*. Lindl.—Fl. hgk. 360.
563. *Orchis Susannae*. Linn. Canton. Sin : *ma chue lan*. Lour. 638.  
*Habenaria Susannae*. R. Br.—Fl. hgk. 363.



564. **Aërides odorata.** Lour. China, Cochin. Sin: *fum lan* (風蘭). 642.

According to Loudon introduced into Europe in 1800.

565. *Epidendron ensifolium.* Linn. China, Cochin. cult. Sin: *lan hoa* (蘭花). Lour. 640.

Osborne. 242.—Fl. hgk. 357. *Cymbidium ensifolium.* Sw.

566. **Phajus grandifolius.** Lour. China, Cochin. cult. 647.

Fl. hgk. 357.—*Bletia Tankervilleae* Br.

567. **Epidendron tuberosum.** Linn. China, Cochin. cult. Lour. 639.

Lamarck Enc. Bot. I. 186. West-Indies.

568. *Ceraja simplicissima.* Lour. China, Cochin. 633.

Endl. Gen. Pl. 1369. *Dendrobium.* Sw.

569. *Gladiolus undulatus.* Linn. Canton, in hortis. Lour. 45.

Spreng. Syst. I. 152. *Gl. cuspidatus.* Linn. C. B. Sp.

570. *Ixia chinensis.* Linn. China, Cochin. cult. Sin: *xe can* (射干). Lour. 46.

Lin. Chin. pl. 243.—Fl. hgk. 365. *Pardanthus chinensis.* Ker.

571. *Crinum zeylanicum.* Linn. China, Cochin. Sin: *san toat.* Lour. 245.

Kth. enum. V. 581. **Crinum Loureiri.** Roem. et Sch.—Loureiro's *Crinum asiaticum.* Linn. (Lour. 244) is according to Roem. et Sch. a new spec: **Crinum cochinchinense.** But *Cr. asiaticum* Linn. has been observed also in South-China. Flor. hgk. 366.

572. *Amaryllis sarniensis.* Linn. Culta in Sinis. Sin: *hiuen tsao* (萱草). Lour. 247.

Kth. enum. V. 618 *Nerine?* **cochinchinensis.** Roem. The above Chin. name is generally applied to *Hemerocallis.*

573. **Tacca pinnatifida.** Linn. China, Cochin. cult. Lour. 368.

Kth. enum. V. 459. India orient., Philipp.

574. **Dioscorea oppositifolia.** Linn. China, Cochin. spont. edulis. Sin: *xan yo* (山藥). Lour. 766.

Fl. hgk. 367.

575. **Dioscorea alata.** Linn. China, Cochin. cult. Sin: *yu thau* (芋頭). Lour. 765.

Osborne. 245.—Kth. enum. V. 387. India orient., Philipp. The above Chin. name is rather applied to *Arum* or *Colocasia.*

576. **Bromelia Ananas.** Linn. Colitur in Cochin. Lour. 237.

577. *Stemona tuberosa.* Lour. China, Cochin. Sin: *pe pu tsao* (百部草). 490.

Kth. enum. V. 287. *Roxburghia gloriosoides*. Jones. (fide Wallich) India orient.

578. **Smilax China**. Linn. China, Cochin. Sin: *thu fu lin* (土茯苓). Lour. 763.

Osborne. 247. But Maxim. Dec. X. 410 doubts whether Lour.'s plant is really Sm. China.

579. **Smilax perfoliata**. Lour. Cochin. 763.

Kth. enum. V. 250. Also in Java (Blume).—Journ. Bot. 1879. 15. Hainan (Swinhoe).

580. *Dracaena ferrea*. Linn. China, Cochin. cult. agrest. Sin: *tiet tsao* (鐵草). Lour. 242.

Osborne. 249.—Kth. enum. V. 24. *Cordyline Jacquini*. China. Introduced in Bengaliam.

581. **Hemerocallis fulva**. Linn. China, Cochin. Sin: *kim cham hoa* (金針花). Lour. 254.

Linn. Chin. pl. 251.

582. **Allium Ceba**. Linn. China, Cochin. cult. Sin: *tsum xi* (蔥). Lour. 249.

Under the above Chin. name in N. China *Allium fistulosum* is cultivated.

583. **Allium sativum**. Linn. Cult. China, Cochin. Sin: *suon* (蒜). Lour. 249.

Cultivated throughout China.

584. *Allium odorum*. Linn. China, Cochin. Sin: *kieu* (韭), *khio*. Lour. 251.

Kth. enum. IV. 454. Lour.'s plant (non Linn.) is *Allium Thunbergii*. Don. Regel Monogr. Allior. 235 combines also *A. chinense*. Don. with this.—In Peking *A. odorum*. Linn. is known under the above Chin. name.

585. *Allium triquetrum*. Linn. China, Cochin. cult. Sin: *kiai*, *kiao theu*. Lour. 250.

Regel l. c. combines it with *Allium Thunbergii*.

586. *Allium angulosum*. Linn. China, Cochin. cult. Sin: *kieu tsai* (韭菜). Lour. 251.

Kth. enum. IV. 422. Lour.'s plant is *Allium uliginosum*. Don. Baker refers this to *A. tuberosum* Roxb. Japan, China, India.

587. *Ornithogalum sinense*. Lour. Canton. Sin: *tien suon* (天蒜). Lour. 255.

Kth. enum. IV. 337. *Bernardia scilloides*. Lindl.—Fl. hgk. 373.—Frequent in North-China.

588. *Aloe perfoliata* Linn. Regnum Champava. Sin: *lu hoei* (盧會). Lour. 252.

This Chin. name is applied in Canton to *Aloe vulgaris*. Lam. (Parker) which is the same as the plant Lour. describes (non Linn.). India, Cambodia.

589. **Fritillaria cantoniensis**. Lour. Canton. Lour. 255.  
Kth. enum. IV. 255. Valde dubia.
590. **Lilium candidum**. Linn. China, Cochin. cult. Sin :  
*pe ho* (百合). Lour. 256.  
Kth. IV. 267. Dubia. The above Chinese name is applied to several  
Lilies with edible bulbs. In Peking *Lilium tigrinum*. Ker.
591. *Lilium pomponium*. Linn. Canton. Sin : *cuon tan hoa*  
(卷丹花). Lour. 257.  
Kth. enum. IV. 259. Lour.'s plant is *Lilium tigrinum*. Ker.—Much  
cultivated in North-China.
592. **Lilium camtchatkense**. Linn. China, Cochin. Sin :  
*chu tan hoa*. Lour. 257.
593. *Melanthium cochinchinense*. Lour. China, Cochin. Sin :  
*tien muen tum* (天門冬). Lour. 268.  
Fl. hgk. 371. *Asparagus lucidus*. Lindl.—In Peking this plant is  
cultivated under the above Chin. name.
594. *Liriope spicata*. Lour. China, Cochin. cult. Sin : *mac*  
*lan*. 248.  
Fl. hgk. 371. *Ophiopogon spicatus*. Ker.
595. *Garciana cochinchinensis*. Lour. Cochin. Canton. Sin :  
*tien lum*. 20.  
Kth. enum. III. 380. *Philydram lanuginosum*. Banks. Also in New  
Holland.—Fl. hgk. 380.—Sin : 田葱 *t'ien ts'ung*. (Parker).
596. **Commelina communis**. Linn. Cochin. Lour. 48.  
Osborn. 252.—Fl. hgk. 376.
597. **Commelina benghalensis**. Linn. Cochin. Lour. 49.  
Fl. hgk. 376.
598. *Tradescantia vaga*. Lour. Canton. Sin : *xit koat*  
*houng*. 239.  
Kth. enum. IV. 104. *Commelina vaga*.
599. *Lechea chinensis*. Lour. Canton. Sin : *chat yu tsao*. 76.  
Kth. enum. IV. 60. *Commelina* ? *Loureiri*.
600. *Commelina tuberosa*. Linn. Cochin. *Tubera edulia*.  
Lour. 50.  
Journ. Bot. VI. 250. Lour.'s plant is *Aneilema Loureiri*. Hance. Canton.
601. *Commelina medica*. Lour. China, Cochin. Sin : *me muen*  
*tum* (麥門冬). Lour. 50.  
Kth. enum. IV. 67. *Aneilema medica*. R. Br.—The above Chinese name  
in China as well as in Japan is applied to *Ophiopogon japonicus*. Ker.
602. **Floscopia scandens**. Lour. Cochin. 238.  
Fl. hgk. 377. Probably identical with *Floscopia paniculata*. Hassk.  
Indian Archip. Hongkong.

603. *Scirpus capsularis*. Lour. China, Cochin. Sin: *tem sin tsao* (燈心草). 55.

Journ. Bot. 1875. 106. Dr. Hance has proved, that this is *Juncus effusus*. Linn. common in China, Manchuria.

604. *Cocos nucifera*. Linn. Cochin. Hainan. Sin: *yai xu* (椰樹). Lour. 692.

605. *Areca Catechu*. Linn. Cochin. China austr. rarior. Sin: *pin lam* (檳榔). Lour. 695.

606. *Phoenix pusilla*. Lour. Cochin. 753.

Add. Fl. hgk. 129. Most likely identical with *Phoenix farinifera*. Roxb. *Ph. acaulis*. Bth. Fl. hgk. 340.

607. *Pandanus odoratissimus*. Linn. China, Cochin. spont. cult. Lour. 739.

Add. Fl. hgk. 129.

608. *Acorus Calamus*. Linn. Chin. Cochin. in locis petrosis. Sin: *xe cham pu* (石菖蒲). Lour. 259.

Kth. enum. III. 87. Lour.'s plant is *Acorus terrestris*. Rumph. India orient. But the true *A. Calamus* is also found in South-China. Fl. hgk. 345.

609. *Orontium cochinchinense*. Lour. China, Cochin. Sin: *xui cham pu* (水菖蒲). Lour. 258.

Kth. enum. III. 87. *Acorus cochinchinensis*. Schott.

610. *Pothos scandens*. Linn. Cochin. Lour. 650.

Fl. hgk. 344.

611. *Arum esculentum*. Linn. China, Cochin. frequentissime. *Cibus est communissimus*. Sin: *hai yu* (海芋). Lour. 654.

Osb. 254.—Kth. enum. III. 37. *Colocasia esculenta*. Schott. *Calladium esculentum* Vent.

612. *Arum Colocasia*. Linn. Cochin. cult. Lour. 653.

Kth. enum. III. 37. *Colocasia antiquorum*. Schott.—According to Parker 芋頭 *yü t'ou* in Canton.

613. *Arum indicum*. Lour. Cochin. cult. 655.

Fl. hgk. 343.—Kth. enum. III. 39. *Colocasia indica*—*A. indicum*. Lour. (fide Roxb.).

614. *Arum macrorrhizum*. Linn. China, Cochin. Sin: *dea vu*. Lour. 654.

Kth. III. 38. Linn.'s plant (India) is *Colocasia macrorrhiza*. Schott.

615. *Arum cucullatum*. Lour. Canton. Sin: *chim mi vu*. 656.

Kth. III. 38. *Colocasia cucullata*. Schott.—Roxb. Fl. ind. III. 501. China australis, Bengalia.

616. *Arum sagittifolium*. Linn. China, Cochin. culta, spont. Sin: *tai lei thau*. Lour. 653.

Kth. III. 44. Linn.'s plant *Xanthosoma sagittaeifolium*. Schott. America.

617. *Arum pentaphyllum*. Linn. China. Sin: *tien nan sin*. (天南星). Lour. 652.



Kth. enum. III. 20. Linn.'s plant *Arisaema pentaphyllum*. Schott. India orient. Lour.'s plant dubious.

618. *Arum triphyllum*. Linn. China, Cochin. Sin: *puon hia* (半夏). Lour. 652.

Kth. enum. III. 20. *Arisaema Loureiri*. Blume. Stirps dubia.

619. *Arum Dracontium*. Linn. China, Cochin. Sin: *puon hia* (半夏). Lour. 651.

Kth. III. 19. Lour.'s plant *Arisaema cochinchinense*. Blume.

620. *Zala asiatica*. Lour. China, Cochin. Sin: *feu peng* (浮萍). 492.

Endl. Gen. Pl. 1669. *Pistia*. In Peking the above Chin. name refers to *Lemna minor*. L.

621. *Typha latifolia*. Linn. China, Cochin. Sin: *pu hoam* (蒲黄). Lour. 675.

Kth. enum. III. 90. Europa, Asia bor., America bor.—Frequent in North-China.

622. *Lemna minor*. Linn. Cochin. Lour. 671.

Osb. 255.—Add. Fl. hgk. 129. Frequent in S. China.—Common also in N. China.

623. *Sagittaria sagittifolia*. Linn. Cochin. Lour. 698.

Osb. 256.—Kth. enum. III. 157. Lour.'s plant is *Sagittaria chinensis*. Sims.

624. *Eriocaulon quadrangulare*. Lour. China, Cochin. Sin: *kouc san tsao* (穀精草). 76.

According to Parker the above Chinese name in Canton is applied to *Eriocaulon Wallichianum*. Mart.

625. *Cyperus rotundus*. Linn. China, Cochin. Sin: *hiam phu cu* (香附子). Lour. 53.

Osb. 262.—Fl. hgk. 387.

626. *Cyperus elatus*. Linn. Cochin. Lour. 54.

Kth. enum. II. 93. Linn.'s plant is *Cyperus distans*. Linn. India orient., Nova Holland. Maurit. C. B. Sp.—Fl. hgk. 387.

627. *Cyperus compressus*. Linn. Cochin. Lour. 54.

Fl. hgk. 385. Common in S. China.

628. *Scirpus supinus*. Linn. Cochin. Lour. 55.

Fl. hgk. 394. *Isolepis supina*. R. Br.

629. *Scirpus miliaceus*. Linn. Cochin. Lour. 55.

Fl. hgk. 393. *Fimbristylis miliacea*. Vahl.

630. *Holcus Sorghum*. Linn. China, Cochin. cult. Lour. 793.

*Sorghum vulgare*. Pers. Cultivated throughout China.

631. *Holcus saccharatus*. Linn. China, Cochin. Lour. 792.

*Sorghum saccharatum*. Pers. Cultivated throughout China.

632. *Andropogon Schoenanthus*. Linn. China, Cochin. cult. Sin: *mao hiam* (茅香). Lour. 793.

Osb. 268.—Kth. enum. I. 493. India orient.

633. *Rhaphis trivialis*. Lour. China, Cochin. 676.  
Kth. enum. I. 505. *Chrysopogon aciculatus*. Trin.—Fl. hgk. 424.
634. *Saccharum spicatum* Linn. Cochin. Sin: *mao ken* (茅根). Lour. 67.  
Kth. enum. I. 470. *Perotis latifolia*. Ait.—Fl. hgk. 418.
635. **Saccharum officinarum**. Linn. China, Cochin. cult. Sin: *can che* (甘蔗). Lour. 66.  
Osb. 265.—The Sugar cane is much cultivated in S. China.
636. **Triticum**. *Variae species nascuntur in China*. Sin: *me* (麥 *Triticum sativum*). Lour. 75.  
Wheat is cultivated throughout China, more commonly in the northern provinces.
637. **Hordeum**. Sin: *meu* (牟). Lour. 75.  
*Meu* is rather the classical Chinese name for Barley, which is cultivated in all provinces of the Empire, but more commonly in the north.
638. *Arundo Bambus*. Linn. China, Cochin. Sin: *ye cho* (葉竹). Lour. 70.  
Osb. 292.—Munro *Bambusaceae*. Trans. Linn. Soc. XXVI. **Bambusa arundinacea**. Retz. India, China. Hongkong cult. Hance. (dubia.).
639. *Arundo agrestis* Lour. China, Cochin. 72.  
Kth. enum. I. 432. **Bambusa agrestis**. Poir.
640. *Poa chinensis*. Linn. Cochin. Lour. 69.  
Osb. 287.—Fl. hgk. *Leptochloa chinensis*. Nees.—Kth. enum. I. 270. *L. tenerrima*.
641. *Cynosurus aegyptius*. Linn. Lour. 75.  
Osb. 291.—*Dactyloctenium aegyptiacum*. Willd. Fl. hgk. 429.—*Eleusine cruciata*. Lam.
642. *Cynosurus indicus*. Linn. Lour. 75.  
Fl. hgk. 429. **Eleusine indica**. Gaert.
643. *Nardus indica*. Linn. In montibus occident. imper. Sinensis. Sin: *cam sum hiam* (甘松香). Lour. 56.  
Kth. enum. I. 258. *Microchloa setacea*. R. Br.—Flor hgk. 428.
644. **Agrostis plicata**. Lour. Canton. Sin: *sam souc tsaw*. 64.
645. *Agrostis indica*. Linn. ? Cochinchina. Lour. 63.  
Osb. 283.—Kth. enum. I. 211. *Sporobolus indicus*. R. Br. Fl. hgk. 426.
646. **Spinifex squarrosus**. Linn. China, Cochin. Lour. 794. Fl. hgk. 415.
647. *Panicum Crus Corvi*. Linn. Cochin. Lour. 59.  
Kth. enum. I. 143. *Panicum Crus Galli*. L. Osb. 275. Fl. hgk. 411.—Common in N. China.
648. **Panicum miliaceum**. Linn. Pekini et aliis locis Sinarum. Colitur. Lour. 59.  
Largely cultivated throughout China.

649. *Panicum italicum*. Linn. China, Cochin. cult. Sin: *siao me* (小米), *so* (粟). Lour. 58.

*Setaria italica*. Kth. Largely cultivated in China.

650. *Alopecurus hordeiformis*. Linn. Cochin. Lour. 60.

Osb. 280.—*Gymnothrix hordeiformis*. Nees. Observed also in N. China.

651. **Coix Lachryma**. Linn. Cult. China, Cochin. Sin: *y y gin* (薏苡仁) Lour. 673.

Kth. enum l. 20. India orient.—Cultivated throughout China.

652. **Coix agrestis**. Lour. 674.

653. **Zea Mays**. Linn. China, Cochin. cult. Sin: *pao tuc* (pao cut 包穀). Lour. 672.

Cultivated throughout China.

654. **Oryza sativa**. Linn. Sin: *mi* (米), *ho* (禾). Lour. 266.

Osb. 281.

655. **Oryza glutinosa**. Rumph. Sin: *no* (糯). Lour. 267.

CRYPTOGAMS.

656. **Equisetum arvense**. Linn. China. Sin: *ma hoam* (麻黃). Lour. 823.

Has been observed in North-China.

657. **Equisetum hiemale**. Linn. China. Sin: *mo ce* (木賊). Lour. 824.

658. **Lycopodium cernuum**. Linn. Cochin. Lour. 838.

Osb. 296.—Fl. hgk. 436.

659. **Ophioglossum lusitanicum**. Linn. China, Cochin. Sin: *xe ui* (石韋). Lour. 825.

The above Chin. name is rather applied to *Niphobolus Lingua*. Spr.

660. *Ophioglossum scandens*. Linn. China, Cochin. Sin: *xi ui tan* (石韋藤). Lour. 825.

Osb. 299.—Fl. hgk. 441. *Lygodium scandens*. Sw.

661. **Adiantum flabellatum**. Linn. Canton. Sin: *tiet quat tsao* (鐵線草). Lour. 836.

Osb. 307.—Fl. hgk. 447.

662. **Adiantum caudatum**. Linn. Cochin. Lour. 835. Fl. hgk. 447.

663. **Pteris vittata**. Linn. China, Cochin. Lour. 834.

Osb. 304.

664. **Polypodium repandum**. Lour. China. Sin: *ku tsui pu* (骨碎補). 826.

665. **Polypodium simile**. Linn. China. Sin: *ku tsui pu* (See the preceding). Lour. 828.

666. *Polypodium varium*. Linn. China, Cochin. Esculentum. Lour. 829.

Os. 300.—Add. Fl. hgk. 140. *Aspidium varium*. Sw.

667. *Polypodium Baromez*. Linn. China, Cochin. Sin : *keu tsie* (狗脊). Lour. 829.

Os. 301.—Fl. hgk. 460. Add. Fl. hgk. 143. *Cibotium glaucum*. Benth. *Cibotium Barometz* J. Sm.

668. *Bryum undulatum*. Linn. China, Cochin. Sin : *sien* Lour. 840.

669. *Agaricus integer*. Linn. China, Cochin. Sin : *kiun* (菌). Lour. 848.

670. *Agaricus deliciosus*. Linn. China, Cochin. Sin : *hiam xuen* (香蕈). Lour. 849.

Dried Mushrooms of the above Chinese name are sold in Peking.

671. *Peziza auricula*. Linn. China, Cochin. Sin : *mo lh* (木耳). Lour. 855.

Sold in Peking.

672. *Clavaria muscoides*. Linn. China, Cochin. prope mare. Sin : *lu kio tsai* (鹿角菜). Lour. 856.

673. *Clavaria pistillaris*. Linn. China, Cochin. Sin : *mo cu tsai* (磨菰菜). Lour. 855.

See above Cibot. 34.

674. *Pe fu lin* (白茯苓). *Tubera ad radices Pinorum* in provincia Su chuyen. *Radix sinensis alba*. Lour. 710.

*Pachyma Cocos*. Fries. See above Martini. 41.

675. *Mucor Mucedo*. Linn. China, Cochin. Sin : *mui*. Lour. 857.

676. *Lichen tartareus*. Linn. China, Cochin. Sin : *tan* (苔). Lour. 842.

677. *Lichen pulmonarius*. Linn. China, Cochin. Sin : *tien hoa* (天花). Lour. 842.

678. *Fucus Tendo*. Linn. In Oceano sinensi. Lour. 678.

679. *Fucus saccharinus*. Linn. Ad littora maris sinici. Lour. 847.

680. *Conferva corallina*. Linn. China, Cochin. Sin : *xe hoa* (石花). Lour. 848.

#### VII. GROSIER. BUC'HOZ.

In 1785 Abbé **GROSIER** published the first edition of his valuable **DESCRIPTION GENERALE DE LA CHINE** in one volume forming the 13th volume of Du Mailla's *Histoire Générale de la Chine*, edited also by the



learned Father Grosier, who was Bibliothécaire de Son Altesse Royale Monsieur, but had himself never visited China. A considerable part of his description of that Empire is devoted to Natural history, namely 108 pages to Botany. A new and much enlarged edition of the work he published from 1818 to 1820 in 7 volumes, nearly three of them treating of Natural history. Vol. II and III, 658 pages, deal with Botany. It supplies a mass of most valuable information with respect to Chinese plants, the vast material accumulated by the author having been principally derived from the accounts of the Jesuit missionaries found in the *Lettres édifiantes*, Du Halde, the *Mémoires conc. les Chinois* etc. But Grosier draws also from many unpublished sources. He endeavours to give a list of the Chinese plants which since then had been described by professed botanists. But besides Loureiro's plants from Southern China, of which he generally gives a full account, his enumeration of Chinese specimens known to botanists is far from being complete.

Although Grosier in reproducing all the observations of the missionaries concerning Chinese botany, seldom ventures to identify the plants described, his compilation is very useful and interesting, and I hope, that with the aid of the identifications and commentaries I have supplied in the preceding pages, almost all the statements of the Jesuits relating to Chinese plants will be understood by botanists.

We learn from Grosier that the Jesuit missionaries have introduced many Chinese plants into the *Mauritius* (Isle de France) and *Bourbon*, where they had also missions. Some of these plants were subsequently introduced from these islands into France. Thus *Eriobotrya japonica*. Lindl. had been brought from Canton to the Mauritius and from this place found its way to France, where in 1784 one specimen of the introduced shrubs blossomed. (Grosier II. 504.)—*Livistonia chinensis*. Mart. a Chinese palm was for a long time known in Europe under the name of *Latania burbonica*. Lam.—*Nephelium Litchi* was introduced at the end of the last cent. from China into the Mauritius and subsequently into Guyana. (Grosier II 478.)—In Lamarck's Enc. Bot. many Chinese plants are noticed as cultivated in the Mauritius. I may quote *Euphoria longana* (*Nephelium longan*) Lam. III. 574, *Cookia punctata*. I. c. VIII. 327, *Driandra cordata* (*Elaeococca vernicia*). I. c. II. 329. *Anona uncinata*. (*Artabotrys odoratissimus*) I. c. II. 127, *Litsaea chinensis* (*Tetranthera laurifolia*). I. c. III. 574. *Dianthus chinensis*. L. cultivated in Europe since the begin-

ning of the last century has probably also been introduced by the missionaries. Tournefort, who first described this plant in the *Memoirs of the Acad. of Paris*, 1705, p. 264, under the name of *Caryophyllus chinensis*, states that Abbé Bignon had received (seeds of) it from China about 3 years earlier.

It is merely for the sake of completeness in illustrating the botanical literature with respect to China, that I mention here two volumes of colored drawings of Chinese plants published by Buc'hoz, physician in ordinary to King Stanislas.

1. *Collection précieuse et enluminée des Fleurs qui se cultivent dans les jardins de la Chine*. Paris 1776, in folio, 100 plates.

2. *Herbier ou Collection des Plantes médicinales de la Chine*, d'après un manuscrit peint et unique qui se trouve dans la bibliothèque de l'Empereur de la Chine. 100 plates.

These drawings with the Chinese names of the respective plants added (not in Chinese characters.) have been copied from some Chinese collection of pictures sent by the missionaries and have no claim to any botanical value. The medicinal plants especially are very badly represented. The other volume with ornamental plants shows more correct drawings.

Buc'hoz was a very prolific botanical author. But his publications are not entitled to serious attention. Pritzel in his *Thesaurus botanicus*, after having enumerated B.'s works states:

Catalogus noster partem solummodo parvam innumerabilium operum miserrimi compilatoris continet, in cujus ignominiam l'Héritier *Buchoziam foetidam* condidit et qui per semiseculum (1758—1807.) ultra 500 volumina consarcinavit.

The plant Pritzel alludes to is *Serissa foetida*. Comm. *Buchozia coprosmoides*. l'Hér. See above Loureiro's plants 278.

We have thus in the preceding pages endeavoured to give a general review of the early knowledge acquired by European naturalists into the flora of China, and have also successively enumerated all Chinese plants which have come under the notice of European botanists up to about the end of the last century. Although the materials for pursuing this line of investigation and for bringing the historical account up to the present day have been accumulated by the author, he must now take leave of the reader, not being in the position at present to work up a treatise which would probably occupy twice as many pages as the present essay.



## INDEX.

- Abies 56, 109.  
 Abrus 146.  
 Acacia 97, 148, 149.  
 Acalypha 173.  
 Acanthopanax 100.  
 Acanthus 165.  
 Acer 56, 67.  
 Achyranthes 53, 106, 107.  
 Aconitum 63.  
 Acorus 180.  
 Acrocephalus 106.  
 Acronychia 141.  
 Acrostichon 114.  
 Actaea 136.  
 Actinostemma 45.  
 Adenanthera 58.  
 Adenosma 104, 165.  
 Adenostemma 156.  
 Adiantum 46, 75, 114, 129, 183.  
 Aërides 7, 177.  
 Agaricus 114, 126, 181.  
 Ageratum 156.  
 Aglaja 143.  
 Agrostis 113, 182.  
 Agyneia 108.  
 Ailantus 95, 120, 125.  
 Aira 113.  
 Ajuga 168.  
 Aleurites 34, 172.  
 Allium 27, 178.  
 Aloë 178.  
 Aloëxylum 6, 15, 144.  
 Alopecurus 112, 183.  
 Alpinia 110, 176.  
 Alternanthera 169.  
 Althaea 93.  
 Alysicarpus 97.  
 Amaranthus 106, 168, 169.  
 Amaryllis 177.  
 Ammania 98.  
 Amomum 176.  
 Amygdalus 149.  
 Anacardium 22, 35.  
 Anagyris 148.  
 Ananassa 22, 119.  
 Anandria 160.  
 Anchusa 163.  
 Andrachne 108, 129.  
 Andropogon 112, 181.  
 Androsace 51, 55.  
 Aneilema 179.  
 Anisopappus 101.  
 Anona 23, 136, 185.  
 Antidesma 172.  
 Antirrhinum 165.  
 Apium 99.  
 Apluda 112.  
 Apocynum 162.  
 Apricot 5, 125, 149.  
 Aquilaria 6, 15, 171.  
 Arachis 96, 128, 145.  
 Aralia 29, 100, 119, 154, 155.  
 Areca 11, 21, 180.  
 Argyreia 163.  
 Arisaema 181.  
 Aristotelea 176.  
 Arsis 140.  
 Artabotrys 136.  
 Artemisia 68, 102, 125, 126, 158, 159.  
 Artocarpus 11, 23, 36, 174.  
 Arum 119, 180, 181.  
 Arundinaria 112.  
 Arundo 113, 182.  
 Asarum 170.  
 Asclepias 162.  
 Asparagus 179.  
 Aspidium 114.  
 Aster 68, 101, 121, 157.  
 Asteromoea 157.  
 Astragalus 96.  
 Astranthus 152.  
 Atalantia 94, 142.  
 Athamanta 100, 154.  
 Aubletia 143.  
 Augia 17, 144.  
 Averrhoa 94, 141.  
 Baccharis 101, 157.  
 Baeckea 98, 119.  
 Bambusa 16, 34, 36, 113, 126, 182.  
 Barkhausia 160.  
 Barleria 105, 119, 165.  
 Barnardia 178.  
 Bartramia 94.  
 Baryxylum 15, 144.  
 Basella 107, 169.  
 Batatas 103, 117, 163.  
 Bauhinia 60.  
 Beancurd 42.  
 Begonia 125.  
 Benincasa 153.  
 Berchemia 76, 95, 144.  
 Beta 169.  
 Betel 36, 107, 118.  
 Betonica 167.  
 Bidens 158.  
 Bignonia 129.  
 Biophytum 141.  
 Biota 175.  
 Blastus 152.  
 Blechnum 114.  
 Bletia 177.  
 Blumea 101, 157.  
 Boehmeria 14, 28, 87, 109, 174.  
 Boerhavia 106, 168.  
 Boletus 114.  
 Boltonia 101, 157.  
 Bombax 140.  
 Bonnaya 104, 165.  
 Brassica 34, 92, 117, 118, 124, 138.  
 Breynia 108.  
 Briza 113.  
 Bromelia 177.  
 Broussonetia 35, 126, 173.  
 Brucea 148.  
 Bryonia 99, 153.  
 Bryum 184.  
 Buchnera 105.  
 Buddleia 162.  
 Buphthalmum 157.  
 Buxus 172.  
 Byssus 115.  
 Cacalia 102, 159.  
 Caesalpinia 15, 148.  
 Cajanus 97, 147.  
 Caladium 180.  
 Calamintha 167.

- Calamus 17.  
 Callicarpa 166, 168.  
 Calligonum 136.  
 Callistephus 101, 121, 157.  
 Calodium 171.  
 Cambogia 139.  
 Camellia 34, 36, 51, 62, 65, 93, 139.  
 Camphor tree 6, 30, 57, 108.  
 Campsis 165.  
 Campylus 168.  
 Canarium 33, 95, 143.  
 Canavalia 97, 147.  
 Canna 110, 176.  
 Cannabis 13, 173.  
 Capparis 138.  
 Capraria 104.  
 Capsella 138.  
 Capsicum 104, 129, 164.  
 Caragana 122.  
 Cardamine 138.  
 Cardiospermum 144.  
 Carduus 159.  
 Carica 22, 152.  
 Carpesium 101.  
 Carthamus 125, 160.  
 Caryophyllus 151.  
 Caryopteris 166.  
 Caryota 11.  
 Cassia 35, 97, 148.  
 Castanea 8, 57, 175.  
 Castanopsis 175.  
 Cassytha 108, 171.  
 Cathetus 172.  
 Caulalis 154.  
 Cedrela 120, 125, 151.  
 Celery 99.  
 Celosia 106, 168.  
 Celsia 106.  
 Celtis 126.  
 Centipeda 158.  
 Centotheca 113.  
 Cephalanthus 155.  
 Cephalotaxus 62.  
 Ceraja 177.  
 Cerastium 138.  
 Ceratophyllum 115.  
 Chalcas 142.  
 Chamaecyparis 175.  
 Chavica 36, 107.  
 Chelidonium 8, 138.  
 Chenopodium 107.  
 Chestnuts 125.  
 Chimonanthus 7, 35, 48.  
 Chloranthus 170.  
 Chloris 112.  
 Chrysanthemum 54, 80, 101, 102, 125, 158.  
 Chrysopogon 182.  
 Cibotium 114, 184.  
 Cichorium 160.  
 Cineraria 159.  
 Cinnamomum 6, 13, 24, 35, 170.  
 Cirsium 159.  
 Cissus 144.  
 Citrus 5, 9, 10, 11, 26, 29, 33, 94, 95, 119, 127, 142, 143.  
 Clathrus 126.  
 Clausena 129.  
 Clavaria 184.  
 Cleistanthus 172.  
 Clematis 91, 135, 136.  
 Cleome 138.  
 Clerodendron 105, 166.  
 Clutia 172.  
 Cnidium 100, 154.  
 Coccinia 153.  
 Cocos 11, 21, 180.  
 Codiaeum 173.  
 Coix 183.  
 Colocasia 111, 117, 180.  
 Columnnea 105.  
 Cometes 71.  
 Commelina 110, 179.  
 Commia 173.  
 Conferva 184.  
 Convallaria 110.  
 Convolvulus 103, 163.  
 Conyza 101, 157.  
 Cookia 129, 142, 185.  
 Corchorus 63, 140.  
 Cordia 163.  
 Cordyceps 30.  
 Cordyline 110, 178.  
 Coreopsis 157.  
 Coriandrum 154.  
 Cornutia 166.  
 Cotula 158.  
 Cotyledon 151.  
 Crantzia 99.  
 Crassula 151.  
 Crataegus 127, 150.  
 Crataeva 138.  
 Creodus 170.  
 Crepis 160.  
 Crinum 177.  
 Crotalaria 96.  
 Croton 108, 172, 173.  
 Crucianella 156.  
 Cryptanthus 115.  
 Cryptomeria 50, 58, 71.  
 Cubospermum 152.  
 Cucumis 153.  
 Cucurbita 99, 119, 152, 153.  
 Cudrania 174.  
 Cunninghamia 34, 62, 109, 175.  
 Cupressus 175.  
 Curanga 165.  
 Curcuma 110, 176.  
 Cyathula 169.  
 Cycas 175.  
 Cydonia 127, 150.  
 Cymbidium 34, 110, 177.  
 Cyminosma 141.  
 Cynanchum 162.  
 Cynometra 24.  
 Cynosurus 113, 182.  
 Cyperus 77, 111, 181.  
 Cytisus 147.  
 Dactyloctenium 113, 182.  
 Damnacanthus 79.  
 Daphne 59, 108, 171.  
 Daphnidium 171.  
 Datura 104, 164.  
 Dancus 154.  
 Davallia 114.  
 Dendrobium 177.  
 Dentella 155.  
 Dentitia 167.  
 Derris 147.  
 Desmodium 96, 97, 145.  
 Desmos 136.  
 Dianthus 93, 138, 185.  
 Dicentra 92, 121.  
 Dicerma 145.  
 Dichroa 150.  
 Dicliptera 105, 165.  
 Digitalis 105, 165.  
 Dilivaria 165.  
 Dimocarpus 144.  
 Dioscorea 110, 177.  
 Diospyros 5, 8, 23, 29, 33, 51, 128, 161.  
 Diphaca 145.



- Dissolena 166.  
 Dolichos 97, 146, 147.  
 Dorstenia 174.  
 Dracaena 110, 178.  
 Drosera 84, 151.  
 Durio 23.  
 Dysoda 156.  
 Eaglewood 6, 15.  
 Ebenoxylum 15, 161.  
 Echium 163.  
 Eclipta 101, 157, 158.  
 Elaeagnus 127, 171.  
 Elaeococca 34, 172, 185.  
 Eleocharis 11, 27 34, 125.  
 Elephantopus 156.  
 Eleusine 113, 182.  
 Emilia 48, 102, 159.  
 Enkianthus 160, 161.  
 Epidendron 110, 177.  
 Epilobium 152.  
 Equisetum 183.  
 Eragrostis 113.  
 Eriachne 113.  
 Erigeron 157.  
 Eriobotrya 23, 65, 150, 185.  
 Eriocaulon 111, 181.  
 Eriodendron 140.  
 Erythrina 146.  
 Ethulia 102.  
 Euclea 161.  
 Eugenia 22, 150, 151.  
 Euonymus 143.  
 Eupatorium 101.  
 Euphorbia 108, 171.  
 Euryale 124.  
 Euxolus 169.  
 Evodia 141.  
 Evolvulus 103.  
 Excoecaria 173.  
 Fagara 141.  
 Fagus 175.  
 Fallopia 140.  
 Fibraurea 138.  
 Ficus 8, 109, 174.  
 Fimbristylis 181.  
 Fleurya 174.  
 Floscopa 179.  
 Foeniculum 154.  
 Fragaria 149.  
 Fraxinus 18.  
 Fritillaria 179.  
 Fucus 115, 184.  
 Fumaria 92, 121.  
 Galanga 176.  
 Galium 156.  
 Galls 126.  
 Gardenia 47, 66, 100, 156.  
 Garciana 179.  
 Garcinia 139.  
 Gaura 152.  
 Genipa 156.  
 Gentiana 156, 162.  
 Gerardia 104.  
 Ginseng 6, 18, 28, 32, 36, 51.  
 Glabraria 171.  
 Gladiolus 177.  
 Gleditschia 122, 126, 148.  
 Glycine 97, 146.  
 Glycyrrhiza 145.  
 Glyptostrobilus 78.  
 Gnaphalium 157.  
 Gomphrena 107, 169.  
 Gonus 143.  
 Gorteria 159.  
 Gossypium 13, 35, 36, 93, 117, 125, 140.  
 Grapes 5, 8, 11.  
 Gratiola 104, 165.  
 Grewia 140.  
 Grisea 98.  
 Guilandina 148.  
 Gymnotrix 112, 183.  
 Gynura 102, 159.  
 Habenaria 176.  
 Haloxylon 126.  
 Hamamelis 67.  
 Hecatonia 136.  
 Hedera 59, 77, 155.  
 Hedona 138.  
 Hedyotis 100, 119, 155.  
 Hedysarum 96, 97, 119, 145, 146.  
 Helicia 171.  
 Helicteres 94, 140.  
 Heliotropium 163.  
 Hemerocallis 110, 128, 178.  
 Herpestis 165.  
 Hibiscus 12, 54, 63, 93, 125, 140.  
 Hisutsua 157.  
 Holcus 181.  
 Homalium 152.  
 Hordeum 182.  
 Houttuynia 170.  
 Hoya 162.  
 Humulus 48, 79, 109.  
 Hydrangea 78, 150.  
 Hydrocotyle 99, 154.  
 Hydrolea 162.  
 Hydropyrum 112.  
 Hypericum 93, 139.  
 Hypoestes 105.  
 Illecebrum 169.  
 Illicium 92, 136.  
 Impatiens 94, 141.  
 Incarvillea 121.  
 Indigofera 33, 96, 145.  
 Insect wax 26, 32, 34.  
 Ipomoea 103, 117, 163.  
 Isatis 35.  
 Ischaemum 112.  
 Isopyrum 64.  
 Itea 151.  
 Ixia 110, 177.  
 Ixora 52, 100, 119, 129, 156.  
 Jambolifera, 141.  
 Jasminum 12, 34, 42, 102, 125, 161.  
 Jatropha 173.  
 Juglans 172, 174.  
 Jujubes 8, 125.  
 Juncus 7, 180.  
 Jungermannia 114.  
 Juniperus 36, 76, 109, 175.  
 Jurinaea 160.  
 Jussiaea 48, 99, 152.  
 Justicia 74, 105, 165, 166.  
 Kaempferia 176.  
 Kalanchoe 151.  
 Kochia 30, 107.  
 Koelreuteria 95, 121.  
 Kyllingia 111.  
 Lablab 147.  
 Lactuca 160.  
 Lagenaria 152.  
 Lagerstroemia 98, 125, 152.  
 Lagunea 169.

- Lamium* 167.  
*Larix* 126.  
*Latania* 185.  
*Laurus* 108, 170, 171.  
*Lawsonia* 98, 152.  
*Lechea* 179.  
*Lemna* 111, 191.  
*Leontodon* 160.  
*Leonurus* 106, 167.  
*Lepidium* 138.  
*Lepta* 141.  
*Leptochloa* 113, 182.  
*Levisticum* 31.  
*Lichen* 114, 184.  
*Ligustrum* 18, 162.  
*Lilium* 179.  
*Limnophila* 104.  
*Limonia* 141, 142.  
*Linaria* 165.  
*Lindera* 171.  
*Lippia* 105, 166.  
*Lipocarpa* 111.  
*Liriodendron* 136.  
*Liriope* 179.  
*Lithospermum* 163.  
*Litsaea* 171, 185.  
*Livistonia* 185.  
*Lobelia* 102, 160.  
*Lonicera* 82, 155.  
*Lophanthus* 106, 118, 167.  
*Loranthus* 52, 108.  
*Lourea* 146.  
*Luffa* 99, 153.  
*Lychnis* 138.  
*Lycium* 59, 104, 122, 164.  
*Lycopodium* 80, 113, 183.  
*Lygodium* 114, 183.  
*Lythrum* 98.  
  
*Maba* 102, 161.  
*Magnolia* 35, 125, 136.  
*Maize* 4, 6.  
*Mallotus* 173.  
*Malva* 79, 93, 139.  
*Mangifera* 23, 96.  
*Manihot* 173.  
*Maranta* 110, 176.  
*Marlea* 155.  
*Marsana* 129.  
*Matricaria* 157.  
*Mazus* 165.  
*Melanthesa* 108, 172.  
*Melanthium* 179.  
  
*Melastoma* 98, 129, 152.  
*Melia* 143.  
*Melilotus* 144.  
*Melissa* 167.  
*Melon* 26, 99.  
*Melothria* 154.  
*Menispermum* 35.  
*Mentha* 80, 167.  
*Mespilus* 88, 150.  
*Michelia* 136.  
*Microchloa* 182.  
*Mimosa* 97, 148.  
*Mirabilis* 106, 168.  
*Mollugo* 99, 154.  
*Momordica* 153.  
*Monarda* 106.  
*Morella* 174.  
*Morinda* 100.  
*Morus* 18, 109, 173, 174.  
*Mucor* 184.  
*Mulgedium* 160.  
*Muricia* 153.  
*Murraya* 129, 142.  
*Musa* 11, 12, 14, 109, 175, 176.  
*Mussaenda* 100, 155.  
*Myrica* 6, 82, 174.  
*Myrtus* 151, 161.  
  
*Narcissus* 110.  
*Nardus* 113, 182.  
*Nasturtium* 138.  
*Nauclea* 100.  
*Nelumbium* 12, 34, 92, 124, 128, 138.  
*Nephelium* 4, 7, 9, 22, 29, 33, 36, 65, 95, 128, 129, 144, 185.  
*Nerine* 177.  
*Nerium* 102, 162.  
*Nicotiana* 27, 28, 104, 117, 125, 164.  
*Nipholobolus* 183.  
*Nyctanthus* 102, 161.  
*Nymphaea* 138.  
*Nymphanthus* 172.  
  
*Ocymum* 105, 106, 166.  
*Oldenlandia* 100, 155, 161.  
*Olea* 13, 34, 66, 102, 161.  
*Onoclea* 114.  
*Opa* 150, 151.  
*Ophioglossum* 114, 183.  
  
*Ophiopogon* 179.  
*Ophispermum* 171.  
*Orchis* 176.  
*Origanum* 167.  
*Ormocarpum* 145.  
*Ormosia* 148.  
*Ornithogalum* 178.  
*Orontium* 180.  
*Oryza* 6, 112, 116, 183.  
*Osbeckia* 98, 161.  
*Osmanthus* 161.  
*Oxalis* 94, 141.  
*Oxyceros* 155.  
  
*Pachyma* 20, 34, 184.  
*Pachyrhizus* 146.  
*Paederia* 156.  
*Paeonia* 12, 125, 136.  
*Paliurus* 60, 143.  
*Panax* 7, 19, 28, 100, 154.  
*Pandanus* 180.  
*Panicum* 112, 182, 183.  
*Pardanthus* 110, 177.  
*Parietaria* 174.  
*Passiflora* 152.  
*Paullinia* 94.  
*Pavetta* 156.  
*Peaches* 5, 125.  
*Pears* 5.  
*Pellionia* 174.  
*Pentapetes* 140.  
*Pergularia* 125, 162.  
*Perilla* 80, 167.  
*Periploca* 103, 162.  
*Peristrophe* 105, 166.  
*Perotis* 182.  
*Persea* 34.  
*Persica* 149.  
*Peziza* 184.  
*Phaca* 96.  
*Phajus* 177.  
*Phallus* 126.  
*Pharbitis* 103, 163.  
*Phaseolus* 97, 117, 127, 146.  
*Philydram* 179.  
*Phoberos* 138.  
*Phoenix* 180.  
*Phrynium* 176.  
*Phyla* 166.  
*Phyllanthus* 68, 108, 129, 172.  
*Phyllaurea* 173.

- Phyllodes 176.  
 Physalis 164.  
 Phyteuma 155.  
 Picria 165.  
 Picris 160.  
 Pimela 143.  
 Pinus 175.  
 Piper 13, 27, 107, 141, 170.  
 Pistia 115, 181.  
 Pisum 146.  
 Plantago 106, 168.  
 Plecospermum 174.  
 Plectronia 154.  
 Pluchea 101, 116, 157.  
 Plum 9.  
 Plumbago 161.  
 Plumeria 162.  
 Poa 113, 182.  
 Poinciana 148.  
 Polanisia 138.  
 Polychroa 174.  
 Polygala 93, 138.  
 Polygonatum 156.  
 Polygonum 43, 50, 74, 82, 107, 119, 121, 125, 169, 170.  
 Polyozus 155.  
 Polypara 170.  
 Polyphema 174.  
 Polypodium 47, 114, 183, 184.  
 Pongamia 147.  
 Porphyra 166.  
 Portulacca 138.  
 Potentilla 81, 149.  
 Pothos 180.  
 Pouzolzia 174.  
 Primula 150, 161.  
 Prunus 31, 149.  
 Psidium 23, 98, 151.  
 Psophocarpus 146.  
 Pteris 30, 75, 114, 129, 183.  
 Pterocarpus 147.  
 Pteronia 157.  
 Pterostigma 104, 165.  
 Pueraria 14, 28, 87.  
 Punica 8, 11, 99, 152.  
 Pupalia 106.  
 Pyrethrum 158.  
 Pyrus 127, 150.  
 Quercus 14, 61, 83, 121, 126, 175.  
 Quinaria 142.  
 Quisqualis 151.  
 Randia 155.  
 Ranunculus 136.  
 Raphanus 92, 116, 138.  
 Raphiolepis 150.  
 Rehmannia 35, 105.  
 Reseda 138.  
 Rhamnus 76, 83, 95, 119, 143.  
 Rhaphis 182.  
 Rheum 6, 19, 24, 31, 34, 36, 107, 170.  
 Rhus 7, 17, 36, 61, 84, 96, 144.  
 Rhynchosia 147.  
 Ricinus 61, 118, 173.  
 Ricotia 138.  
 Robinia 33, 122, 145, 147.  
 Rosa 12, 51, 98, 149, 150.  
 Rosewood 6, 15, 34.  
 Rosmarinus 167.  
 Rostellularia 105.  
 Roxburghia 178.  
 Rubia 48, 84, 100.  
 Rubus 54, 98, 149.  
 Ruellia 104, 105, 165.  
 Rumex 170.  
 Ruta 141.  
 Saccharum 8, 36, 111, 117, 182.  
 Sagittaria 50, 111, 181.  
 Sageretia 95.  
 Salacia 95, 143.  
 Salisburia 128.  
 Salix 15, 30, 50, 175.  
 Salomonina 93, 138.  
 Salvia 106.  
 Sambucus 100, 155.  
 Santalum 171.  
 Sapindus 122, 144.  
 Saururus 170.  
 Saxifraga 98, 150.  
 Scabiosa 156.  
 Scirpus 111, 180, 181.  
 Scolopia 138.  
 Scoparia 165.  
 Seropularia 106.  
 Scutellaria 84, 106.  
 Sebifera 171.  
 Sedum 151.  
 Selinum 100, 154.  
 Senecio 101, 102, 159.  
 Septas 165.  
 Serissa 156, 185.  
 Serratula 160.  
 Sesamum 165.  
 Setaria 183.  
 Sida 93, 94, 139.  
 Sideroxylon 161.  
 Siegesbeckia 70, 101, 157.  
 Sinapis 92, 118, 119, 138.  
 Sium 99, 154.  
 Sizygium 150, 151.  
 Smilax 6, 20, 24, 34, 36, 76, 110, 178.  
 Soja 27, 97, 146.  
 Solanum 103, 164.  
 Solena 153.  
 Solidago 101, 156.  
 Sonchus 160.  
 Sophora 30, 48, 122, 145, 148.  
 Sorghum 181.  
 Spathium 170.  
 Sparmacoe 100.  
 Sphaeranthus 101, 157.  
 Spilanthus 156.  
 Spinacia 107, 169.  
 Spinifex 182.  
 Spiraea 149.  
 Spiranthes 176.  
 Sporobolus 182.  
 Stachys 167.  
 Stapelia 162.  
 Stemona 177.  
 Sterculia 28, 35, 36, 51, 60, 85, 93, 140.  
 Stillingia 18, 34, 42, 48, 51, 61, 65, 109, 173.  
 Streblus 173.  
 Striga 105, 165.  
 Strophanthus 162.  
 Stylidium 155.  
 Symplocos 161.  
 Syringa 121.  
 Tacca 177.  
 Tagetes 158.  
 Tamarindus 85, 97, 119, 148.  
 Tamarix 138.  
 Tanacetum 63, 102, 158.  
 Taraxacum 160.

- Taxus 109.  
Tecoma 129, 165.  
Tetracera 136.  
Tetranthera 171.  
Teucrium 168.  
Thalictrum 136.  
Thea 7, 13, 27, 28, 34, 36, 40, 41, 42, 50, 51, 61, 76, 93, 119, 139.  
Thela 161.  
Thlaspi 138.  
Thuja 109, 175.  
Toddalia 94.  
Torenia 104, 116, 119.  
Torilis 154.  
Torreya 109.  
Toxicarpus 162.  
Trachytella 136.  
Tradescantia 179.  
Trapa 12, 99, 124, 152.  
Triadica 173.  
Tribulus 141.  
Trichomanes 114.  
Trichosanthes 99, 152, 153.  
Tridesmis 173.  
Trifolium 144.  
Triphasia 141.  
Trisanthus 154.  
Triticum 182.  
Triumfetta 94, 119.  
Tussilago 71, 159, 160.  
Typha 181.  
Ulmus 87.  
Unona 129, 136.  
Uraria 97, 146.  
Urena 93, 119, 139, 140.  
Urtica 173, 174.  
Utricularia 105.  
Uvaria 129, 136.  
Vaccinium 51.  
Valeriana 106.  
Vanda 7.  
Vandellia 104.  
Vanieria 174.  
Varnish 7, 33.  
Varronia 163.  
Vatica 93.  
Verbena 105, 166.  
Verbesina 101, 119, 158.  
Vernicia 172.  
Vicia 146.  
Vinca 162.  
Viola 138.  
Viscum 108.  
Vismia 139.  
Vitex 105, 122, 166.  
Vitis 87, 144.  
Volkameria 105, 166.  
Waltheria 94.  
Watermelon 26, 99, 127.  
Wedelia 101, 158.  
Wheat 4, 6.  
Wikstroemia 108, 171.  
Wistaria 32.  
Xanthium 87, 101, 157.  
Xanthoceras 34.  
Xanthosoma 180.  
Xeranthemum 87, 159.  
Zala 181.  
Zanthoxylum 27, 33, 47, 51, 58, 59, 67, 73, 100, 121, 141.  
Zea 183.  
Zehneria 153.  
Zingiber 24, 117, 176.  
Zizyphus 95, 122, 125, 128, 143, 144.  
Zornia 145.
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## ERRATA AND ADDENDA.

- Page. 29 Line 13 *For* W. Hooker *read* W. J. Hooker.
- " 34 " 15-17 *For* as my friend etc., *read* as I learn from the Report of the Kew Gardens 1879, p. 37, *Persea Nan mu* Oliv.—sin: 楠木 *nan mu*.
- " 35 " 2 from below. *For* Ou long chu *read* Ou tong chu.
- " 36 " 10 *For* tsz' *read* ts'z'.
- " " 19 *For* call *read* called.
- " 37 " 4 & 3 from below. *For* both written in 1701 *read* written in 1700 and 1701.
- " 38 " 10 *For* 1701 (but perhaps in 1700) *read* 1700.
- " 46 " 2 from below. *For* Linneus *read* Linnaeus.
- " 50 " 16 *For* 柳楊 *read* 楊柳.
- " " 19 *For* Abictis *read* Abietis.
- " 51 " 11 from below. *For* Linneus *read* Linnaeus.
- " 62 " 12 *For* Lammarck *read* Lamarck.
- " 64 " 9 *For* Crodil. *read* Crocodil.
- " " 13 from below. *For* H. Asiae *read* Fl. Asiae.
- " 66 " 23 *For* fractu *read* fructu.
- " " 24 *For* A Kilcola *read* An Kilcola.
- " 67 " 12 *For* semine *read* semina.
- " 68 " 20 *For* includente *read* includens.
- " 69 " 21 *For* 48 *read* 42.
- " " 18 from below. *For* 440 *read* 450.
- " 70 " 9 " " *For* Sigesbeckia *read* Siegesbeckia, and add after L.: Gieseke.
- " 73 " 22 *For* fosciculos *read* fasciculos.
- " 76 " 11 from below. *For* Inall. *read* Inali.
- " 78 " 25 *Dele*: But it seems . . . to Chinensis. L.
- " " 18 from below. *For* cochllatum *read*: cochleatum.
- " 81 " 8 *Dele*: It seems . . . to wrong.
- " 87 " 2 *After* iabrusca *add*: (V. ficifolia Bge.).
- " 92 " 6 *For* hardly *read* certainly not.
- " 97 " 7 *For* 352 *read* 353.
- " 98 " 13 *For* This name *read* The name.
- " 113 " 12 from below. *For* 蘆筴 *read* Perhaps 蘆筴.
- " 116 " 5 *For* 543 *read* 453.
- " 121 " 8 *For* Shantung *read* Chili.
- " 122 " 9 from below. *Read* 16. It is generally etc.

- „ 125 „ 9 *After tinder add : V. 517.*  
 „ „ „ 18 from below. *For Pergulatoria read Pergularia.*  
 „ „ „ 19 „ „ *For hiaug read hiang.*  
 „ 144 „ 2 *After Lam. add : var. spinosa Bg.*  
 „ 146 „ 8 & 9 from below. *For See above Martini. 26. read according to Dr. Hance=L. angulatus. Rich.*  
 „ 150 last Line. *After Fl. hgk. 123.—add : Probably 常山 chang shan a famous Chin. febrifuge.*  
 „ 151 Line 14 from below. *After Fl. hgk. add : 120.*  
 „ 153 „ 20 *For Lav. read Sav.*  
 „ „ „ 6 from below. *For Coccinea. Spec. dubia, read Spec. dubia Coccinea ?*  
 „ 156 „ 18 *For Bullock ? read a Bullock.*  
 „ 158 „ 1 *Dele : Ct. after Osb.*  
 „ „ „ 16 from below. *For Dec. X. read Dec. XI.*  
 „ 159 „ 19 „ „ *For 194 read 191 a.*  
 „ 162 „ 3 „ „ *For Giesel. read Griseb.*  
 „ 163 „ 14 „ „ *For Oso. read Osb.*  
 „ 165 „ 9 „ „ *After : China add : chi ma.*  
 „ 166 „ 18 *For 85 read 185.*  
 „ 167 „ 16 *After Europa add : O. vulg. Bullock, Hupeh. Journ. Bot. 1880, p. 300.*  
 „ 168 „ 21 *After Canton add : Amoy. Hance, Journ. Bot. 1880, p. 301.*  
 „ 171 „ 14 & 18 from below. *For Wickstroemia read Wikstroemia.*  
 „ 173 „ 3 from below. *For Morisam, read Mori, sam.*  
 „ 177 „ 8 *For 357 read 355.*  
 „ 178 „ 7 from below. *For Bernardia read Barnardia.*  
 „ 179 „ 3 „ „ *For Floscopia read Floscopa.*  
 „ 180 „ 26 *For Calladium read Caladium.*  
 „ 182 „ 23 *After Fl. hgk. add : 430.*

## ARTICLE II.

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# COINS OF THE PRESENT DYNASTY OF CHINA.\*

By S. W. BUSHELL, M.D.

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IN the first number of the Journal of the Society, published in June 1858, there is a paper by Mr. A. Wylie on the "Coins of the Ta Ts'ing or Present Dynasty of China," which is excellent as far as it goes. Since its publication however so many additional varieties have been discovered that a collection of some of them may be useful to the numismatic student. Chinese authors generally neglect recent coins although the latest Ni Mu in his voluminous work the Ku chin ch'ien luo 古今錢略, published in 1877 in 36 books, commences with a series of the decrees and memorials relating to the coinage, with extracts from the official regulations on the subject, and devotes his 1st book to the money of the reigning dynasty concluding with the Chia ch'ing period. On the large coins of the Hsien fêng period there is a separate brochure by Pao k'ang, the 大泉圖錄 Ta ch'üan t'ou lu published in 1876, which contains most accurate woodcuts of the specimens described, and gives also figures of the government silver and cash notes issued by the Board of Revenue during the same reign, with an appendix containing a series of letters on paper money.

Nearly all the figures in this paper are from fac-simile rubbings of coins in my own collection. I am indebted to the extensive collection of Mr. G. B. Glover for two or three not in my possession. I have figured only such as appear to be distinct varieties issued by the government mints. No special attention has been paid to different modes of writing the same Chinese character such as 隆, 隆, for the second character of 乾隆 Ch'ien lung; 寶, 寶 for 寶 pao &c. Still less have attempts been made to include every variation in the strokes

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\* Read before the Society on the 7th June, 1880.

of the Manchu characters which are often corrupt and due only to the ignorance of the illegal coiner.\*

No. 1 was issued by the second emperor of the dynasty **太宗** *T'ai tsung* who succeeded in 1627. The inscription is in the original pointless form of the Manchu character. The obverse read in the order—left, top, bottom, right—has *Sura han ni chiha* "Money of the *T'ien ts'ung* period, corresponding to the Chinese, **天聰之寶** *T'ien ts'ung chih pao*. The reverse has on the left *chuwan* "ten," on the right *enü yan* "one liang," giving the value and weight of the coin.†

Nos. 2-12 belong to the reign of **世祖** *Shih tsu* (1644-1661), the first of the dynasty to rule over China, and have on the obverse *Shun chih t'ung pao* "Current coin of the *Shun chih* (period)."

No. 2 has a ring on the reverse, above.

No. 3 has a dot above.

No. 4 has a dot on the left.

No. 5 has **戶** *Hu* above, indicating its issue from the **戶部** *Hu pu*, the Board of Revenue.

No. 6 has above **宣** *Hsüan*, for Hsüan-fu in the province of Chih-li.

No. 7 has on the right **川** *Ch'uan*, for Ssü-ch'uan.

No. 8 has on the right **午** *Wu*, the meaning of which is doubtful.

No. 9 has on the left **一** *Yi* "one."

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\* Many of these are given in an article by Mr. J. Kirkwood in the *China Review* (Vol. VII. No. 3) to which I may refer those curious in such matters. Nos. 21, 22, 23, 33, 34, 37, 62, 63, 65, 77 for instance differ from coins figured by Mr. Wylie only, if at all, in the slightest variation in the form of the Manchu letters. No 4 in the same article is a typical example of the ingenuity of the Chinese variety-monger a common *Shun-chih* coin having been altered by the conversion of **東** *tung* into **申** *shên* and some of the strokes of the corresponding Manchu word chiselled away so as to form an illegible monstrosity. Two of the *Chi hsiang* coins are wrongly given as belonging to the *Ch'ien lung* reign and there are other errors in the brief descriptive notes. On the other hand several of the above coins were first figured in this paper and I owe to the author some exchanges of rare specimens.

† For a full description of this coin see a note of mine in the *China Review* Vol. VI. p. 143. It was modelled after coins, with the same inscription in Chinese on the reverse, current during the Ming dynasty. A similar large coin of the *Shun chih* period is referred to in the *Ku chin ch'ien luo* with Chinese inscription on the reverse, **十** *shih* above, **一兩** *yi liang* on the right, but it is excessively rare and I have not even seen a figure of it.



No. 10 has *Tung* in Manchu and Chinese indicating the Shan-tung mint, and an additional character 工 *Kung* below.

No. 11 has *Fu* in Manchu and Chinese and was issued in Fu-chien where a mint was founded in 1649.

No. 12 has *Hsi* in Manchu and Chinese and was probably cast in the Shansi mint.

No. 13 belongs to the reign of 聖祖 *Shéng tsu* (1662-1722). It has on the obverse *K'ang hsi tung pao*, on the reverse *Nan* in Manchu and Chinese, for the Hu-nan mint, with a crescent above and dot or star below.

No. 14 is an additional coin of the reign of 世宗 *Shih tsung* (1723-1735). It has on the obverse *Yung chéng tung pao*, on the reverse *Pao ning*, a transcript of 寶寧, the name of the Ning-po mint.

Nos. 15-25 belong to the reign of 高宗 *Kao tsung* (1736-1795), and have on the obverse *Ch'ien lung tung pao*, "Current coin of the Ch'ien lung period."

No. 15 has on the reverse *Pao wu*, the mint of Wu-ch'ang the provincial capital of Hu-pei, with a star below.

No. 16 the same inscription, with a star above.

No. 17 has on the reverse *Pao tai*, a transcript of 寶臺, having been issued from the mint of 臺灣 *Tai-wan* (Formosa).

No. 18 has on the reverse *Pao i* "I-li mint," a transcript of the Chinese 寶伊, and has a bar above. For this mint, as well as for the silver coinage of Tibet, the regulation was made in succeeding reigns that one fifth of the coins issued should have the inscription *Ch'ien lung tung pao*, in memory of the conquest of the country.

Nos. 19-24\* are from the mints of Mohammedan cities of Chinese Turkestan, the names of which they have on the reverse in Manchu and Turki, the alphabet of the latter being derived from the Arabic, but so badly written on the coins as to be hardly decipherable. The coins are of reddish alloy being composed of 84 pts. of copper, 34.8 of lead, and 1.2 of tin, in 120 pts. The zinc which gives the yellow colour to the ordinary Chinese coins is not easily obtainable in these districts.

No. 19 has *Aksu* on the left in Manchu, *Aksi* on the right in Turki. The transcript in Chinese is 阿克蘇.

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\* No. 19 is figured by Mr. Wylie. Three of the others are also included by him but not from actual specimens.

No. 20 has *Ushi* on the left in Manchu, the Chinese form of which is 烏什; and *Ush* in Turki on the right.

No. 21 has on the left *Yerkiyang* in Manchu, the transcript of the Chinese 葉爾羌; *Yarkand* on the right in Turki.

No. 22 has on the left *Yerkim* in Manchu, the transcript of the Chinese 葉爾奇木; on the right *Yarkand* in Turki.

No. 23 has *Kashigar* on the left in Manchu and *Kashgar* on the right in Turki. The Chinese form is 喀什噶爾.

No. 24 has *Hot'iyen* on the left in Manchu, the transcript of the Chinese 和闐. The Turki form ought to be *Khoten*, the second syllable of which is legible on the coin.

No. 25 has on the reverse 安南 *An-nan*. It is a thin, badly cast coin and similar in aspect to the ordinary cash of Cochin-China. It is figured also in the *Ku chin ch'ien luo* and described as issued after the submission of 阮光平 *Juan kuang p'ing*.

Nos. 26-37 belong to the reign of 仁宗 *Jén tsung* (1796-1820) and have on the obverse *Chia ch'ing t'ung pa o*.

No. 26 has on the reverse *Pao ch'owan* for 寶泉 the Board of Revenue mint with a dot above.

No. 27 *Pao yuwan* for 寶源, the mint of the Board of Works, with a dot below.

No. 28 the same inscription with a ring below.

No. 29 *Pao che* for 寶浙 the Che-chiang mint, with a dot below.

No. 30 *Pao k'iyen* \* for 寶黔 the Kuei-chou mint, with a dot above.

No. 31 *Pao u* for 寶武 the Wu-ch'ang mint.

No. 32 *Pao ch'ang* for 寶昌 the Nan-ch'ang mint, with a dot above on the left.

No. 33 *Pao yün* for 寶雲 the Yun-nan mint, with a crescent above.

No. 34 *Pao t'ai* for 寶臺 the T'ai-wan mint.

No. 35 *Pao i* for 寶伊 the I-li mint.

No. 36 has the same inscription with a perpendicular bar below.

No. 37 has *Aksu* on the left in Manchu, on the right in Turki.

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\* Mr. Wylie is wrong in referring the coins with this inscription to the Fu-chien mint, the second character of which would be transliterated in Manchu without an aspirate.

Nos. 38-56 belong to the reign of 宣宗 *Hsüan tsung* (1821-1850) and have on the obverse *Tao kuang t'ung pao*.

No. 38 has on the reverse *Pao ch'ioan* for 寶泉 the Board of Revenue mint, with a dot above.

No. 39 *Pao chi* for 寶直 the Chih-li mint.

No. 40 *Pao fu* for 寶福 the Fu-chien mint.

No. 41 *Pao shan* for 寶陝 the 陝西 "Shan-hsi" mint.

No. 42 *Pao k'iyen* for 寶黔 the Kuei-chou mint, with a ring above.

No. 43 the same with a dot in the centre of the circle.

No. 44 the same inscription with a cross above.

No. 45 a cross below.

No. 46 a solid triangle in relief above.

No. 47 a similar triangle below with apex pointing downwards.

No. 48 a crescent above.

No. 49 has also *Pao k'iyen* with 大 ta "great" above.

No. 50 *Pao i* for 寶伊 the I-li mint.

No. 51 the same inscription with a dot above.

No. 52 the same with a vertical bar above.

No. 53 is a larger coin from the I-li mint, with the character 十 shih "ten" above, indicating its value to be equal to ten of the common small cash.

No. 54 has *Aksu* on the left in Manchu, on the right in Turki.

No. 55 the same inscription with 八年 *pa nien* "eighth year" (1828) above, and 五 *wu* "five" below, to mark the value.

No. 56 like the last with 十 shih 10 instead of 5. These two coins were issued after the recovery of the Mohammedan cities which had revolted from the Chinese rule, and the capture of Jehangir (張格爾), the descendant of the old Khoja rulers who took the title of Sultan in Kashgar in 1826 and was afterwards brought to Peking and beheaded.

The coins issued during the reign of 文宗 *Wên tsung* (1851-1861), the title of whose reign was 咸豐 *Hsien fêng*, are much more numerous. On account of the rebellion in the central provinces the supply of copper which is mainly derived from Yunnan was cut off, and the government was reduced to great straits. In 1853 Ch'i Chün-tsao the minister in charge of the Board of Revenue memorialized to advise the issue of large coins equal to ten of the ordinary small cash. Then iron furnaces were founded and large quantities of iron coins

thrown into circulation. Soon after large coins of the nominal value of 50 and 100 were cast. These were so successful that the princes and high officials of the Council constituted to put down the rebellion recommended the issue of larger tokens each one representing 500 and 1000 units, and these circulated together with the rest and a new currency of iron and zinc small cash.

At first both officials and common people are said to have united in praise of the convenience of these large coins, but the large margin of profit tempted false coiners who swarmed like bees, and though executed in crowds, others took their place, including even the Buddhist monks. The result was a rapid depreciation of the large coins and finally nobody would take them at any price. Only those of the nominal value of 10 remained in circulation and these still constitute the actual currency of the capital. Their value however has sunk to that of two of the small cash and a tael of silver exchanges for about eight hundred.

The iron money held its ground till 1857 during the first Chinese month of which year there was a popular rising in Peking and it became, at one bound, so much worthless metal. Some of the provincial mints issued iron and zinc coins which had a yet shorter life.

At the time of the issue of the large tokens in the capital orders were sent to the provincial governors to have similar coins made in the various mints, after models which were distributed by the Board of Revenue. In some of the mints the coins were cast but never circulated; in others they circulated for a short time and were then withdrawn; in the rest the receipt of the models was acknowledged, and some pattern coins were duly forwarded for the inspection of the emperor, but no mint was opened.

There are altogether so many varieties that a collection in tabular form of the specimens figured here, together with the fifteen included in Mr. Wylie's article, may be useful, if only as a basis for future discovery and addition.



TABLE OF HSIEN-FENG C (COPPER) AND I (IRON) COINS.

PROVINCE.	CITY.	MINT-NAME.	1.	5.	10.	20.	30.	40.	50.	100.	200.	500.	1000.	NOTES.
Chih-li	Peking	Pao ch'üan	C.I.	C.	C.I.				C.	C.	C.	C.	C.	rev. wu wen, shih wen. rev. star and crescent.
"	"	"	C.	C.	C.I.				C.	C.	C.	C.	C.	
"	"	Pao yüan	C.	C.	C.I.				C.	C.	C.	C.	C.	
"	Pao-ting fu	Pao chih	C.I.	C.	C.I.				C.	C.	C.	C.	C.	
"	Chi-chou	Pao chi	C.	C.	C.I.				C.	C.	C.	C.	C.	
Shan-tung	Tsi-nan-fu	Pao tai	C.	C.	C.I.		C.		C.	C.	C.	C.	C.	
Kiang-su	su-chou-fu	Pao su	C.	C.	C.I.				C.	C.	C.	C.	C.	
Che-kiang	Hang-chou-fu	Pao che	C.	C.	C.I.				C.	C.	C.	C.	C.	
Kiang-si	Nan-ch'ang-fu	Pao ch'ang	C.	C.	C.I.				C.	C.	C.	C.	C.	
Fu-kien	Fu-chou-fu	Pao fu	C.I.	C.	C.I.				C.	C.	C.	C.	C.	
"	"	"							C.	C.	C.	C.	C.	
"	"	"							C.	C.	C.	C.	C.	
"	"	"							C.	C.	C.	C.	C.	
Hu-nan	Ch'ang-te-fu	Pao te	C.	C.I.	C.I.				C.	C.	C.	C.	C.	
Ho-nan	K'ai-feng-fu	Pao ho	C.I.	C.	C.				C.	C.	C.	C.	C.	
Shan-si	T'ai-yuan-fu	Pao tsin	C.	C.	C.				C.	C.	C.	C.	C.	
Shen-si	Si-an-fu	Pao shan	C.	C.	C.				C.	C.	C.	C.	C.	
Kan-su	Kung-ch'ang-fu	Pao kung		C.	C.				C.	C.	C.	C.	C.	
"	Ti-hua-chou	Pao ti							C.	C.	C.	C.	C.	
Kuang-si	Kuei-lin-fu	Pao kuei	C.		C.				C.	C.	C.	C.	C.	
Ssu-ch'uan	Ch'eng-tu-fu	Pao ch'uan	C.		C.				C.	C.	C.	C.	C.	
Yun-nan	Yun-nan-fu	Pao yun	C.		C.				C.	C.	C.	C.	C.	
"	Tung-ch'uan-fu	Pao tung	C.		C.				C.	C.	C.	C.	C.	
Kuei-chou	Kuei-yang-fu	Pao ch'ien	C.		C.				C.	C.	C.	C.	C.	
"	Ta-ting-fu	Pao wu	C.		C.				C.	C.	C.	C.	C.	
Hu-pei	Wu-ch'ang-fu	Pao nan	C.		C.				C.	C.	C.	C.	C.	
Hu-nan	Chang-sha-fu	Pao kuang	C.		C.				C.	C.	C.	C.	C.	
Kuang-tung	Kuang-chou-fu	Pao i	C.		C.				C.	C.	C.	C.	C.	
Ili	Kuldja	Aksu	C.		C.				C.	C.	C.	C.	C.	
"	Aksu	Aksu	C.		C.				C.	C.	C.	C.	C.	
"	Yarkand	Yarkand							C.	C.	C.	C.	C.	

Nos. 57-61 are from the Board of Revenue and have the name of the mint in Manchu *pao ch'iuwan*, the transcript of 寶泉, on the reverse.

No. 57 has on the obverse *Hsien fêng chung pao* "Heavy coin of the Hsien fêng period", on the reverse 伍文 *wu wên* indicating its value to be 5.

No. 58 reverse 拾文 *shih wên* "ten cash." This and the preceding are rare.

No. 59 is the ordinary Board of Revenue coin, having on the reverse *tang shih*, "equivalent to 10." Both copper and iron.

No. 60 has on the obverse *Hsien fêng yuan pao* "Large coin of Hsien fêng", on the reverse *tang érh pai* "equal to 200".

No. 61 the same obverse, reverse *tang wu pai* "equal to 500".

No. 62 the same obverse, reverse *tang ch'ien* "equal to 1000".

Nos. 63-67 have similar inscriptions to the above from which they are distinguished by the addition of a crescent and dot or star on the reverse, to shew that they were cast and presented to the emperor by the Hereditary Prince of K'och'in 克勤郡王.

Nos. 68-70 are from the Board of Works and have the mint on the reverse in Manchu *pao yuwan*, from the Chinese 寶源.

No. 68 reverse *tang shih* "equal to 10" exists also in iron.

No. 69 reverse *tang wu pai* "equal to 500."

No. 70 reverse *tang ch'ien* "equal to 1000".

Nos. 71-74 belong to Chih-li and were issued from Pao-ting-fu, the provincial capital. They have on the reverse the name of the mint in Manchu *pao chi*, the transcript of 寶直.

No. 71 is the unit, and occurs both in copper and iron.

No. 72 reverse *tang shih* "equal to 10".

No. 73 *tang wu shih* "equal to 50".

No. 74 *tang pai* "equal to 100".

Nos. 75-78 are from the mint established at Chi-chou for the eastern division of the province of Chih-li. The mint-name on the reverse is in Manchu *pao ki*, the transcript of 寶薊. No small cash appear to have been issued.

No. 75 reverse *tang wu* "equal to 5".

No. 76 *tang shih* "equal to 10".

No. 77 *tang wu shih* "equal to 50".

No. 78 *tang pai* "equal to 100".

Nos. 79-81 have on the reverse the Manchu *pao tsi*, the transcript probably of 寶濟 the mint of Tsi-nan-fu in Shan-tung. The mint in this province was closed in the Ch'ien-lung

reign and there is no record of its having been re-opened. The specimens figured are extremely rare and appear to be examples of a few patterns cast merely for imperial inspection as described above.

No. 79 is the unit, from Mr. Glover's collection.

No. 80 the "heavy coin" with *tang shih* "equal to 10" on the reverse.

No. 81 *tang wu shih* "equal to 50".

Nos. 82-85 are from the mint of Su-chou-fu in the province of Chiang-su having on the reverse in Manchu *pao su*, the transcript of 寶蘇. The units, 10 and 100, are figured in Mr. Wylie's paper and these complete the series.

No. 82 has on the reverse *tang wu* "equal to 5". Both copper and iron specimens occur.

No. 83 *tang erh shih* "equal to 20".

No. 84 *tang san shih* "equal to 30".

No. 85 *tang wu shih* "equal to 50".

Nos. 86-87 are from the Chê-chiang mint and have in Manchu on the reverse *pao che*, the transcript of 寶浙.

No. 86 has 十 *shih* "ten" on the reverse. It is much rarer than the coin of corresponding value figured by Mr. Wylie with *tang shih* on the reverse.

No. 87 is also a rare coin in the collection of Mr. H. B. Morse with *tang ssü shih* "equal to 40" on the reverse and is the only known instance of that value.

Nos. 88-90 are from the province of Chiang-hsi and have on the reverse in Manchu *pao ch'ang*, the transcript of 寶昌, for the Nan-ch'ang-fu mint. They are of 1, 10 and 50 nominal value and the inscriptions are similar to the preceding.

Nos. 91-104 are from the Fu-chien mint and have on the reverse in Manchu *pao fu*, the transcript of 寶福.

No. 91 obverse *Hsien fêng chung pao*; on the reverse *tang wu* "equal to 5", the nominal value, and on the rim *êrh ch'ien wu fên* "two ch'ien five fên", the weight. This style of inscription of characters within squares sunk in the rim was adopted from the Japanese.

No. 92 has on the obverse *Hsien fêng tung pao*, on the reverse *yi shih* "10".

No. 93 on the obverse *Hsien fêng chung pao*, and the same reverse.

No. 94 the same obverse and reverse with the addition of *chi chung wu ch'ien* "of the weight of 5 ch'ien" on the rim of the reverse.

No. 95 is similar but with *chi chung wu ch'ien* on the field of the reverse.

No. 96 on obverse *Hsien fêng tung pao*, on reverse *érh shih* "20".

No. 97 on obverse *Hsien fêng chung pao*, the same reverse.

No. 98 is identical with *chi chung yi liang* "weighing one liang" on rim.

No. 99 *chi chung yi liang* on the field of the reverse.

No. 100 on obverse *Hsien fêng tung pao*, on reverse *wu shih* "50".

No. 101 on obverse *Hsien fêng chung pao*, on reverse *wu shih*.

No. 102 the same with *érh liang wu ch'ien* on the rim of reverse.

No. 103 on obverse *Hsien fêng chung pao*, on reverse *yi pai* "100".

No. 104 similar with the weight—5 liang—*chi chung wu liang*, on the rim of the reverse.

Nos. 105-108 are from the Hu-nan mint and have on the reverse in Manchu *pao te*, the transcript of 寶德, for Ch'ang-tê-fu. Of Nos. 106, 107 I have both copper and iron coins.

Nos. 109-116 are from the Ho-nan mint, having on the reverse in Manchu *pao ho*, the transcript of 寶河.

No. 109 is figured from an iron coin. No. 110 has a crescent, No. 111 a circle on the reverse; these are of copper but so wretchedly cast as to be almost illegible, and it is possible that the Manchu legend is *pao su* for the Chiang-su mint.

No. 112 reverse *tang shih* "equal to 10".

No. 113 *tang wu shih* "equal to 50".

No. 114 *tang pai* "equal to 100".

No. 115 *tang wu pai* "equal to 500".

No. 116 *tang ch'ien* "equal to 1000".

Nos. 117, 118 are from the Shan-si mint and have on the reverse in Manchu *pao chin* (*tsin*), the transcript of 寶晉, the name of the mint being derived from the ancient name of the province.

Nos. 119-124 are from the Shen-si mint having on the reverse in Manchu *pao shan*, the transcript of 寶陝.

No. 119 is the ordinary small cash.

No. 120 has on the reverse *tang shih* "equal to 10".

No. 121 *tang wu shih* "equal to 50".

No. 122 *tang pai* "equal to 100".

No. 123 *tang wu pai* "equal to 500".

No. 124 *tang ch'ien* "equal to 1000". This specimen has on the reverse a square sunk in the rim below containing the



character 官 *kuan*, to indicate that it belongs to a government coinage.

Nos. 125-129 are from a mint started during this reign for the province of Kan-su at Kung-ch'ang-fu, and have on the reverse in Manchu *pao kung*, the transcript of 寶 鞏.

No. 125 has on the reverse *tang wu* "equal to 5".

No. 126 *tang shih* "equal to 10".

No. 127 *tang wu shih* "equal to 50".

No. 128 *tang pai* "equal to 100".

No. 129 *tang ch'ien* "equal to 1000".

Nos. 130, 131 are from a mint founded in the extreme N.W. of the province of Kansu at Urumtsi, called by the Chinese Ti-hua-chou, and have on the reverse in Manchu *pao ti*, the transcript of 寶 迪. They are of red copper without zinc in the alloy like the Ili coinage.

No. 130 has on the reverse *tang pa* "equal to 8" and is a solitary instance of this denomination.

No. 131 *tang shih* "equal to 10".

Nos. 132, 133 belong to the Kuang-si mint and have on the reverse in Manchu *pao kui*, the transcript of 寶 桂, for the capital Kuei-lin-fu. No 133 of the nominal value of 10 seems to have been the only large coin cast. In the adjoining province of Kuang-tung it is said that no large cash were issued from the mint.

Nos. 134-138 are from the Ssü-ch'uan mint and have on the reverse in Manchu *pao ch'üan*, the transcript of 寶 川.

No. 135 has a crescent on the reverse. No. 136 the character 文 *wén* "unit."

No. 137 *tang shih* "equal to 10".

No. 138 *tang wu shih* "equal to 50".

Nos. 139-147 are from the mint of the provincial capital of Yun-nan and have on the reverse in Manchu *pao yün*, the transcript of 寶 雲. There are many varieties of small cash of which eight are figured. No. 140 has on the reverse a circle above. No. 141 a circle below. No. 142 a crescent with a dot. No 143 has a form of the character *wu* "five" above, referring probably to the month of the year, possibly to the year of the reign. No. 144 has 合 *ho*, perhaps a contraction of 拾 *shih* "ten", above, a circle with central dot below.

No. 145 has a crescent below.

No. 146 also a crescent below and 十 *shih* "10" above.

No. 147 has on the reverse *tang shih* "equal to 10".

Nos. 148, 149 are from the mint of Tung-ch'uan-fu in the province of Yunnan, and have on the reverse in Manchu *pao tung*, the transcript of 寶東.

No. 149 has on the reverse the Chinese character *chéng* above. The first month of the year is called *chéng yueh*.

Nos. 150-156 belong to the province of Kuei-chou where there are two mints, one at Kuei-yang-fu, the capital, the other at Ta-ting-fu. The coins of both have on the reverse in Manchu *pao k'iyán*, the transcript of 寶黔, from the ancient name of the country.

No. 151 has on the reverse *san* "three" probably the month of the year in which it was issued.

No. 152 a cross, a form of *ssü* "four".

No. 153 a form of *ch'i* seven in the same style of figure.

No. 154 *shih* "ten".

No. 155 *tang shih* "equal to 10".

No. 156 *tang wu shih* "equal to 50".

Nos. 157-160 are from the Hu-pei mint in the city of Wu-ch'ang-fu and have on the reverse in Manchu *pao u*, the transcript of 寶武. The denominations are 1, 10, 50 and 100, with the usual inscriptions on the reverse.

No. 161 belongs to the original Hu-nan mint which was at Chang-sha-fu, the capital of the province, and has on the reverse in Manchu *pao nan*, the transcript of 寶南. This city was taken by the Taip'ing insurgents before the issue of the large coins which were struck for this province at a new mint founded at Ch'ang-tê-fu (Figs. 105-108).

Nos. 162-164 are from the Ili mint, having on the reverse in Manchu *pao i*, the transcript of 寶伊.

No. 162 has on the obverse *Hsien fêng t'ung pao*, and is the unit of the currency.

No. 163 obverse *Hsien fêng chung pao*, reverse *tang wu shih* "equal to 50".

No. 164 obverse *Hsien fêng yuan pao*, reverse *tang pai* "equal to 100".

Nos. 165-169 are from the Aksu mint and have the name of the city on the reverse—on the left in Manchu, on the right in Turki which is written with the Arabic alphabet.

No. 165 represents the unit.

No. 166 has on the obverse *Hsien fêng t'ung pao*, on the reverse *tang wu* "equal to 5".

No. 167 a similar obverse with *tang shih*, "equal to 10", on the reverse. A Chinese numismatist, with characteristic-

ally minute analysis, notes that the character 當 is unusually broad and sprawling, proving that the old Tao kuang moulds were used, the characters 八年 being obliterated (see Nos. 55. 56) and replaced with a separate stamp.

No. 168 obverse *Hsien fêng chung pao*, reverse *tang wu shih* "equal to 50".

No. 169 obverse *Hsien fêng yuan pao*, reverse *tang pai*, "equal to 100".

Nos. 170, 171 are from the Yarkand mint and have the name of the city on the reverse, on the left in Manchu—*Yerkiyang*—on the right in Turki—*Yarkand*.

No. 170 obverse *Hsien fêng tung pao*, reverse *tang shih* "equal to 10".

No. 171 obverse *Hsien fêng yuan pao*, reverse *tang pai*, "equal to 100".

No. 172 is figured here from its similarity in style of inscription and alloy to the coins of Chinese Turkestan. It has a on the obverse *Hsien fêng tung pao*, on the reverse *tang wu* "equal to 5", and two other characters which would appear to be Manchu and Turki but are so badly written as to be undecipherable.

Nos. 173-203 belong to the reign of 穆宗 *Mu tsung* (1862-1874). After the death of his father on August 22nd 1861 at Jê-hô (Jehol), the new emperor succeeded and Chi hsiang "Good Luck" was chosen for the name of the epoch, the first year of which would have been 1862. After the return to Peking however there was a *coup d'état*, the Council of eight appointed by the late Emperor were degraded and the principal members executed, and Prince Kung, in conjunction with the two Empresses Dowager, became Regent. The *nien hao* was then changed to Tung chih "Union in order". Money had already been cast in the metropolitan mints but it had not yet been issued, so that the cash were re-melted, a few only being kept as curiosities. They are figured here.

No. 173 has on the obverse *Chi hsiang chung pao* "Heavy money of the Chi hsiang period", on the reverse *tang shih* "equal to 10" with the name of the Board of Revenue Mint in Manchu *pao ch'iuwan*.

No. 174 a similar inscription with *pao yuwan* in Manchu for the Board of Works Mint on the reverse.

Nos. 175-176 with the inscription *Chi hsiang tung pao* "Current money of the Chi hsiang period" belong to the unit currency of the same two mints.

No. 177 has on the obverse *Tung chih tung pao*, on the reverse *pao ch'iuwan* for the Board of Revenue Mint.

No. 178 on the reverse *pao yuwan*, for the Board of Works.

No. 179 *pao chi* for the Chih-li mint.

No. 180 *pao su* for the Chiang-su mint.

No. 181 *pao che* for the Chê-chiang mint.

No. 182 *pao ch'ang* for the Chiang-si mint.

Nos. 183-186 have *pao fû* \* for the Fu-chien mint. No. 183 has also on the reverse the Chinese character *chêng* probably for the first month. No. 184 *chiu* "nine" in contracted form. No. 185 *shih* "ten". No. 186 *shih êrh* "12."

No. 187 *pao chin* for the Shan-si mint.

No. 188 *pao kung* for the Kansu mint at Kung-ch'ang-fu.

No. 189 *pao kui* for the Kuang-si mint, and a circle above.

No. 190 *pao ch'uan* for the Ssu-ch'uan mint.

Nos. 191, 192 *pao yôn* for the Yun-nan mint with 合 (a contraction of 拾 ten?); and *shih yi* "11".

No. 193 *pao tung* for the second Yun-nan mint at Tung-ch'uan-fu, with *chêng* above and a crescent below.

No. 194 *pao u* for the Hu pei mint.

No. 195 *pao nan* for the Hu-nan mint.

No. 196 *pao kuwang* for the Kuang-tung mint.

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\* On these specimens the *fu* is written with a diphthong instead with a simple vowel as in preceding reigns.



**TABLE OF MINTS AND ANNUAL COINAGE (1865).**

PROVINCE.	CITY.	MINT NAME.	ANNUAL COINAGE.
Chihli .....	Peking .....	Pao ch'üan ...	899,856,000
„ .....	„ .....	Pao yuan ...	449,928,000
„ .....	Paotingfu ...	Pao chih ...	60,756,840
Shansi .....	T'aiyuanfu ...	Pao tsin .....	17,472,000
Kiangsu .....	Suchoufu ...	Pao su .....	111,992,052
Kiangsi .....	Nanch'angfu .	Pao ch'ang ...	42,037,992
Fukien .....	Fuchoufu ...	Pao fu .....	43,200,000
Chêkiang ...	Hangchoufu .	Pao chê .....	129,600,000
Hupei .....	Wuch'angfu .	Pao wu .....	84,420,000
Hunan .....	Ch'angshafu .	Pao nan .....	48,054,000
Shensi .....	Sianfu .....	Pao shan .....	94,589,040
Ssüch'uan ...	Ch'êngtufu ...	Pao ch'uan ...	157,733,333
Kuangtung...	Kuangchoufu	Pao kuang ...	34,560,000
Kuangsi .....	Kueilinfu ...	Pao kuei .....	24,000,000
Yunnan .....	Yunnanfu ...	Pao yun .....	125,682,480
„ .....	Tungch'uanfu	Pao tung ...	44,886,600
Kueichou ...	Kueiyangfu .	Pao ch'ien ...	67,329,900
„ .....	Tatingfu ...	„ .....	22,443,300
Ili .....	Kuldja .....	Pao i .....	1,122,000

This collection of small T'ung chih cash is not complete and it may be supplemented by a table of the mints and of the amount of copper money annually cast at each, extracted from the 欽定戶部則例, the official regulations of the Board of Revenue as corrected up to 1865. The numbers are generally calculated for ordinary years and would be proportionally greater when there is an intercalary month. This work may be referred to for details concerning the alloy, the source of the metal used &c. The general weight of each cash is directed to be 1.2 ch'ien. A number of heavier coins weighing 1.6 ch'ien are cast before the new year for distribution among the guards and eunuchs of the palace, made of pure brass composed of 60 per cent of copper and 40 per cent of zinc; these are called *kua t'ung ch'ien* "lamp hanging money", in popular slang *huang kai-tzū* "yellow covers". The percentage of the ordinary money ought to be 54 of copper, 42.75 of zinc, 3.25 of lead. In the provinces where the copper is of inferior quality no lead must be used, its place being supplied with zinc. In Ili where there is no zinc there are in 12 parts, 8.4 of copper, 3.48 of lead and 0.12 of tin.

With regard to the form etc. at the beginning of each reign, models are carved in ivory and presented to the superintendent of the central mint. If approved these are copied with the chisel in pure copper, and the copper models are used to impress the first moulds in which the "mu ch'ien" are produced. These "mother coins" are distributed to the various mints, and the provincial authorities have to cast from them a number of "yang ch'ien" "pattern coins" and forward them to the Emperor for approval.

Nos. 197-203 comprise large coins which have survived from the token-issue of the previous reign, and all have the inscription *T'ung chih chung pao*, with the exception of the Yarkand specimen which has *tung pao*.

No. 197. has on the reverse *Tang shih* "equal to 10" and is from the Hu pu mint.

No. 198 belongs to the Kung pu mint.

No. 199 with *tang wu* "equal to 5" and No 200 *tang shih* "equal to 10" are from the Kung-ch'ang-fu mint in Kan-su.

No. 201 with the inscription Aksu in Manchu and Turki is a large well-cast specimen and has the appearance of a model coin.

No. 202 with *tang shih* "equal to 10" has *Yerkiang* in Manchu, *Yarkand* in Turki.

No. 203 is an anomalous coin extracted from the Tach'ien t'oulu with *pao i* for the Ili mint and *tang ssū* "equal to 4" on the reverse.

Nos. 204-207 belong to the present Emperor the title of whose reign is Kuang hsi "Brilliant succession" beginning in 1875. They are specimens of the large and small coinage of the two metropolitan mints.

Nos. 208-211 are examples of medals cast in the government mint.

No. 208 has on the obverse *K'ang hsi chung pao* "Heavy coin of the period K'ang hsi" (1662-1722): on the reverse a dragon and phoenix with two medallions containing the characters *pao ch'uan*, the name of the mint. A similar medal contains two dragons on the reverse. These are said to have been cast in obedience to a special decree for imperial presents. Dragon and phoenix medals were cast during the three succeeding reigns but not for imperial use and the execution is much inferior.

No. 209 has on the obverse *Tao kuang tung pao*, on the reverse *T'ien hsia tai ping*. "Peace throughout the empire". Coins with this and other felicitous sentences, such as 長命富貴 *ch'ang ming fu kuei* "long life, happiness and rank", are cast at the new year and presented with the "lamp-money" for palace use, and are said to be attached to the corners of wrappers &c. No. 210 with *Yi tung tien hsia* "The empire under one rule" is a similar medal of the reign Hsien fêng.

No. 211 is a medal with the inscription *T'ung chih tung pao*, and on the reverse figures of the eight diagrams. Whenever a new hall is built in the palace, a *pao ho* "precious box" is put upon the main beam with these "pa kua" medals inside and built into the roof. The box contains in addition current coins of the period, precious stones, the five kinds of metal, the five sorts of grain and silk of different colours. Placing this box under the roof is another instance of the curious contrariety of Chinese customs compared with those of the west.

Nos. 212, 213 are examples of charms, each one taken from a series, which are sometimes confounded with circulating coins of the same period. It is a common superstition that a set of twenty Kang hsi coins, strung together so that the names of the mints on the reverse can be read as a kind of verse, are an efficient protection, if carried by the traveller, against disaster by sea or land. A complete set of the original coins not being so easy to get the demand is supplied by a more modern issue. The Tao kuang and Hsien fêng sets have the Manchu *pao* all through, the Tung chih set the names of the localities transcribed in badly written Manchu, as well as in Chinese.

Nos. 214, 215 belong to 福王 Fu wang, a descendant of the Ming Dynasty who was proclaimed at Nanking in 1644.

No. 214 has on the obverse *Hung kuang tung pao*, on the reverse two dots above and below. Two other small coins of this issue exist, one with a ring above, the other with the character 厘 *li* written transversely below.

No. 215 is a large coin with the same inscription on the obverse, and on the right of the reverse *érh* "two" indicating its value.

Nos. 216, 218 were issued by 唐王 T'ang wang, another prince of the Ming who established his court at Fu chou in 1645.

No. 216 has on the obverse *Lung wu tung pao* and a plain reverse.

No. 217 a dot on the reverse above.

No. 218 with the same inscription and plain reverse is a large coin and equivalent to two of the ordinary cash. It occurs both in copper and iron.

Nos. 219-230 were issued by another scion of the Ming, 永明王 Yung ming wang who was proclaimed Emperor on the death of T'ang wang in 1646.

No. 219 has on the obverse *Yung li tung pao*, on the reverse two dots.

No. 220 on the reverse *kung* for Kung pu below.

No. 221 the same character on the right of the reverse.

No. 222 御 *yü* "imperial".

No. 223 勅 *ch'ih* "imperial order".

No. 224 鄂 *o* for the province of Hu-pei, of which it is the ancient name.

No. 225 道 *tao* for the chief officer of the circuit tao-t'ai.

No. 226 府 *fu* for the prefect.

No. 227 is a thicker coin with 二 元 *érh li*, the last character being contracted, indicating the value.

No. 228 with the same obverse in the seal character and plain reverse is equal to two small cash.

No. 229 a larger coin has on the reverse *wu li* "5 li", its value in silver and is equal to 5 unit-coins.

No. 230 still larger has on the reverse *yi fén*, shewing its value to be one hundredth of a tael of silver, equivalent to 10 small coins.

Nos. 231-234 belong to the coinage of another descendant of the Ming entitled 魯王 Lu Wang whose seat of government was at Taichon in Chekiang. Only one coin of this issue is



figured in Mr. Wylie's paper with 戶 *hu* on the reverse for the Board of Revenue.

No. 231 with *Ta ming tung pao* on the obverse has a plain reverse.

No. 232 has 工 *kung* for the Board of Works.

No. 233 帥 *shuai*, "commander-in-chief."

No. 234 the same character on the right.

No. 235 belongs to the coinage of the rebel 張獻忠 *Chang Hsien-chung* who established himself in the capital of the province of Ssü-ch'uan in 1644. It has on the obverse *Ta shun tung pao*, on the reverse below 戶 *hu* for the Board of Revenue.

Nos. 236, 237 belong to the issue of another rebel 孫可望 *Sun k'o wang*, the adopted son of the last, who was proclaimed as 東平王 *Tung ping wang*. No 236 has on the obverse *Hsing ch'ao tung pao*, on the reverse *kung* for the Board of Works. No 237 is a larger coin with the same inscription, equal to two of the former. The existence of any coin of this mintage with plain reverse is very doubtful.

Nos. 238-245 were issued by the Chinese general 吳三桂 *Wu San-kuei* who had invited the Manchus into China, and been appointed by them to rule Yunnan with the title of "Prince for the pacification of the West" 平西王. He cast money then with the inscription 利用通寶 *Li yung tung pao*. In 1674 he declared himself Emperor with *Chao wu* as the title of his reign.

No. 238 has on the obverse *Li yung tung pao*, on the reverse, below, *kung* for the Board of Works.

No. 239 on the reverse to the left *li* indicating the value.

No. 240 on the reverse, above, *kuei* for the province of Kuei-chou.

No. 241 on the right *yun* for the province of Yun-nan.

No. 242 with *wu li* on the reverse, is equal to 5 small coins.

No. 243 with *yi fên*, the silver-value, written transversely on the reverse, is an unusually small coin.

No. 244 the ordinary large cash of this mint, equal also to 10 units, has on reverse *yi fên* at the top and bottom.

No. 245 with the same inscription and value has *yi* written in its more complicated form.

No. 246 has on the obverse *Chao wu tung pao*, on the reverse, below, *kung*, for the Board of Works.

No. 247 has *chéng* above and *chung* below on the reverse, the meaning of which is not clear.

No. 248 is a unit-coin with the same inscription in the seal character on the obverse and plain reverse.

No. 249\* a large coin with an inscription in the same style, has on the reverse 一分 *yi fên* for the silver-value.

No. 250 was issued by 吳世璠 *Wu Shih-fan* the grandson and successor of *Wu San-kuei* who died in 1679. It has on the obverse *Hung hua tung pao*, on the reverse, on the right, *kung* for the Board of Works.

Nos. 251-253 belong to another rebel coinage of the beginning of the reigning Manchu dynasty and were issued by 耿精忠 *Kéng Ching chung* who headed an insurrection in *Fu-chien* and *Kuang-tung* which was put down in two years.

No. 251 has on the obverse *Yü min tung pao*, on the reverse, on the right, *tung*.

No. 252 a large well cast coin with the same inscription on the obverse, has *yi ch'ien* on the reverse for the silver-value, shewing that ten were equivalent to one tael.

No. 253 a similar coin with *yi ch'ien* on the left of the reverse, *ché* for the province of *Chê-chiang* on the right. †

Nos. 254-258 belong to the coinage of the *T'ai ping* rebels. The rebellion began in *Kuangsi* and the chief 洪秀全 *Hung Hsiu-ch'uan* declared himself Emperor in 1851 and took for the title of his dynasty 太平天國 *Tai ping tien kuo* "Celestial State of Great Peace." He died in 1864 and *Nanking* was retaken the same year.

No. 254 has on the obverse *T'ai ping tien kuo*, on the reverse *shêng pao* "sacred money".

No. 255 the same inscription, with *shêng pao* written transversely.

No. 256 the same obverse in different order, and a similar reverse.

No. 257 on the obverse *Tien kuo shêng pao* "Sacred money of the Celestial State", on the reverse *T'ai ping*.

No. 258 on the obverse *T'ai ping shêng pao* "Sacred money of the *T'ai ping*" with *Tien kuo* on the reverse. ‡

\* Mr. Wylie's No. 220, an anomalous figure with seal-character, obverse and reverse in the ordinary style, is perhaps figured from description only. I have never seen an actual specimen like it.

† Another coin of this mint is mentioned with 二分 *êrh fên* on the reverse.

‡ Silver coins of different denominations were issued by the *Tai ping* rebels with the legend *Tien kuo shêng pao* "Sacred coin of the Celestial State". The official silver coinage of *Tibet* instituted in 1792 is also not included in this paper, having been figured and described in the "China Review" Vol. VI. p. 349. I have heard of silver coins issued recently by *Tso Tsung-t'ang* in *Kansu* but have not seen a specimen.

No. 259 is a specimen which appears to belong to a recent rebel coinage. It has on the obverse *Huang ti tung pao* "Circulating coin of the Huang ti (Emperor)", on the reverse *pao ché* the name of the Chê-chiang mint.

In the third year of Hsien fêng (1853), when the large copper tokens were coined, the government paper currency of preceding dynasties was also revived. The notes of two kinds, cash-notes and silver notes, were issued by the Board of Revenue and forced into circulation by paying part of the salary of officials in the new currency and by compelling the banks and large pawnbroking establishments to accept it in lieu of more solid money. The value of these notes however depreciated rapidly until in 1861 they were sold by Dutch auction in the streets of the capital at a discount of 97 per cent (see Dr Rennie's *Peking and the Pekingese*). Soon after this they disappeared altogether from circulation.

The cash-notes are of four denominations equivalent to 500, 1000, 1500, and \* 2000 cash respectively. They are printed from wood-blocks with blue ink on thick whitish paper. The specimen figured is of the value of 1000 cash. It is headed *Ta ch'ing pao ch'ao* "Money note of the great Ch'ing (dynasty)". The ornamental border has above two dragons striving for a pearl, below the fabulous mountain of precious stones with coral-trees in the midst of sea waves, and at the sides clouds interrupted by medallions containing, on the right the character *T'ien hsia tung hsing* "To circulate throughout the empire," on the left *Chün p'ing ch'u ju* "Issued and accepted at equal value." Within the border are three lines; the central specifying the value "Equivalent without deduction to 1000 pieces of government cash"; the right the number 426 in black, partly stamped partly written, classified under the character *p'ien* (one of the words of the thousand character classic used numeratively); the left the date "Made in the seventh year of Hsien fêng (1857)", the number of the year stamped in blue with a separate stamp. Below these is printed: "These notes shall circulate in place of government cash and will be received in the proportion fixed for the different taxes, for all the customs dues, and for the purchase of rank. The treasuries both of the capital and provinces shall alike accept and forward them. The cash-notes shall be exchangeable for government silver-notes in the proportion of 2000 cash

\* There is an excellent illustration of a 2000 cash note dated 1859 in Col. Yule's *Marco Polo* (Vol. I. p. 384).

"for one tael of silver." The large square vermilion seal in the centre is that of the Revenue Board in Manchu and Chinese, *Ta ch'ing pao ch'ao chih yin*. The small oblong seal in black under the date is that of the official in charge put on when the number is written. There is also at the side a round seal (differing in design in different notes) and blotched lines made with a brush before the note has been out from the tally.

The silver notes are printed on fine Korean paper, also from wooden blocks, in blue. I have examples of 1, 3, 5, 10 and 50 taels and figure the first. The ornamental border has five dragons traversing clouds in the direction of a pearl emitting rays of brilliance like flames, and waves of the sea below with precious emblems floating upon them. Within this border there is at the top an oblong frame containing, in Manchu *Poihun ni churhan ni alpan temket'u*, in Chinese *Hu pu kuan piao* "Government note of the Board of Revenue." The central line has "Equivalent by the two tael scale to one tael of pure silver", the number impressed in black with a large stamp. On the right "Number 29643 of the numeral kung", the first character stamped in black, the number written. On the left the date "Hsien fêng 3rd year (1853), 11th month, 9th day", the year and month printed in black by separate stamps, the day in manuscript. There is printed below: "The Board of Revenue has memorialized to recommend the circulation of government notes. All shall willingly take these government notes in exchange for silver and for copper money, and they shall be equivalent in all cases to silver. In accordance with the regulations fixed by the Board, they shall be accepted in definite proportion in payment of government dues. Those who counterfeit them shall be punished according to the statutes and shall not be pardoned." Outside the border on the left near the top is printed "Each tael is 6 per cent less than that of the treasury scale." There are two vermilion seals with inscription in Manchu and Chinese, the small square one in the centre being *Hu pu kuan piao yung yuan t'ung hsing* "The Board of Revenue government note for everlasting circulation." The large oblong one on the edge *Hu pu kuan piao so kuan fang* "The official seal of the Board of Revenue government note office." The third large square crimson seal on the right edge with the Chinese inscription *Hu pu chih yin* "Seal of the Board of Revenue" indicates that the note is for provincial circulation. The figure below to the left is the private signature impressed when the number is written.





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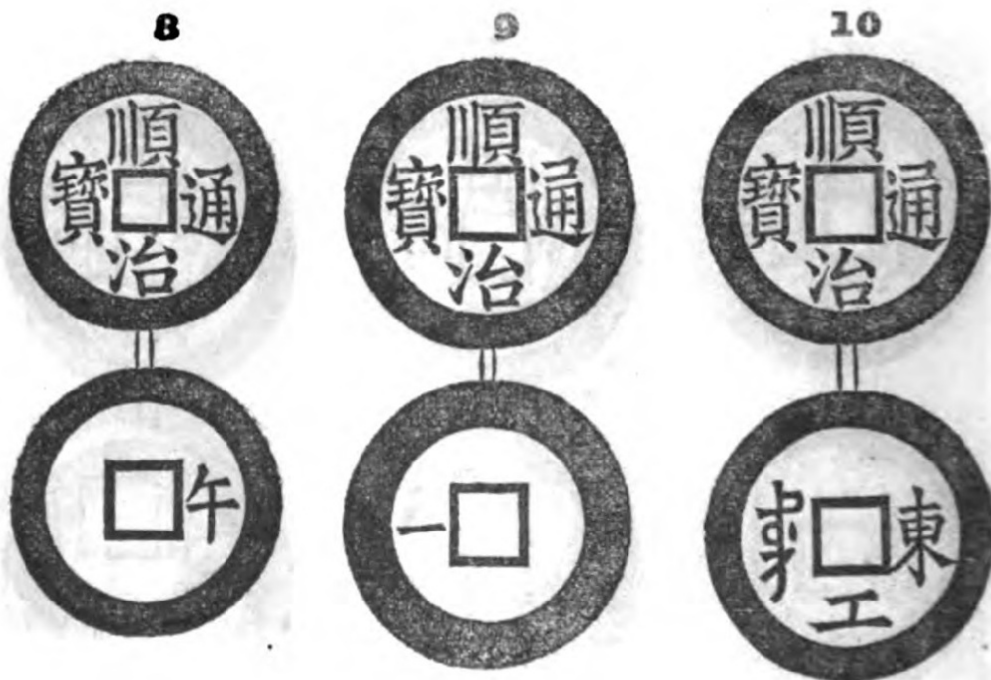
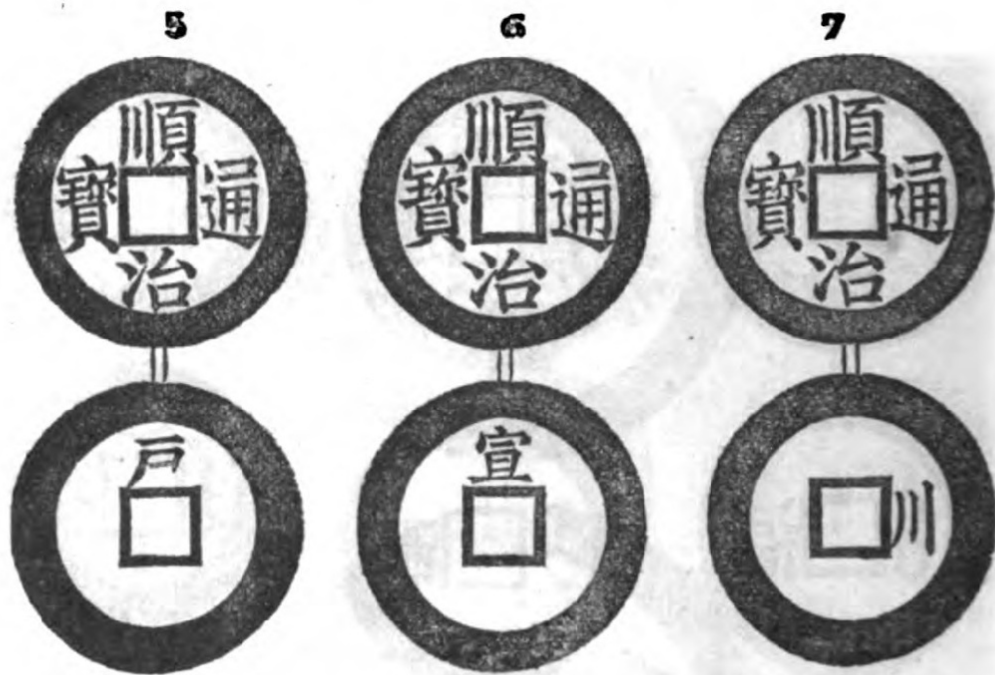


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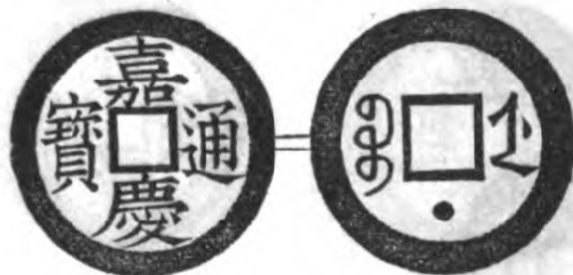
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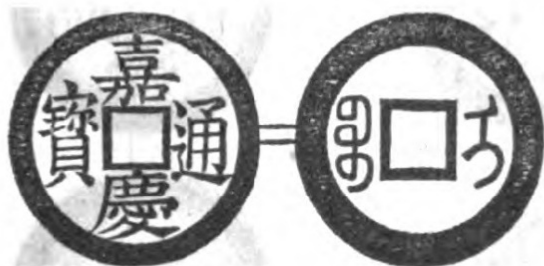
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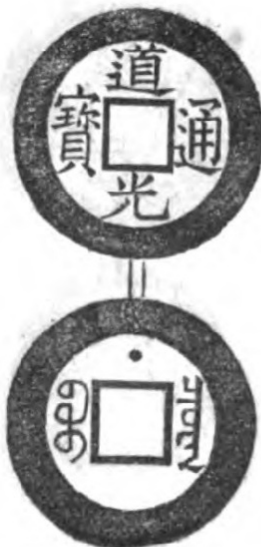
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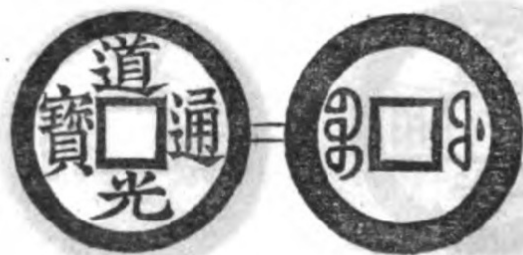
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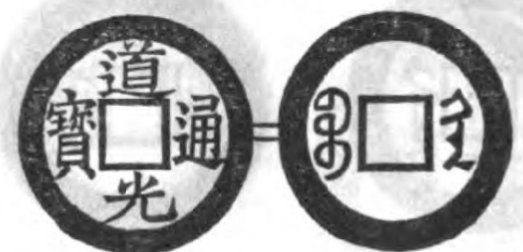
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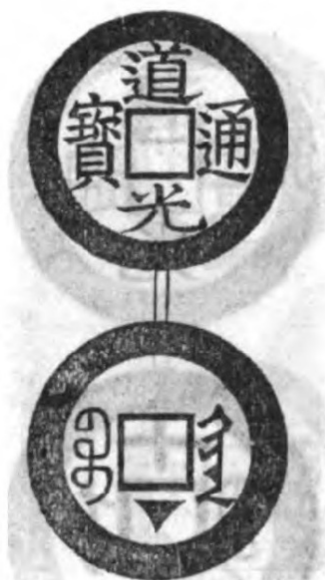




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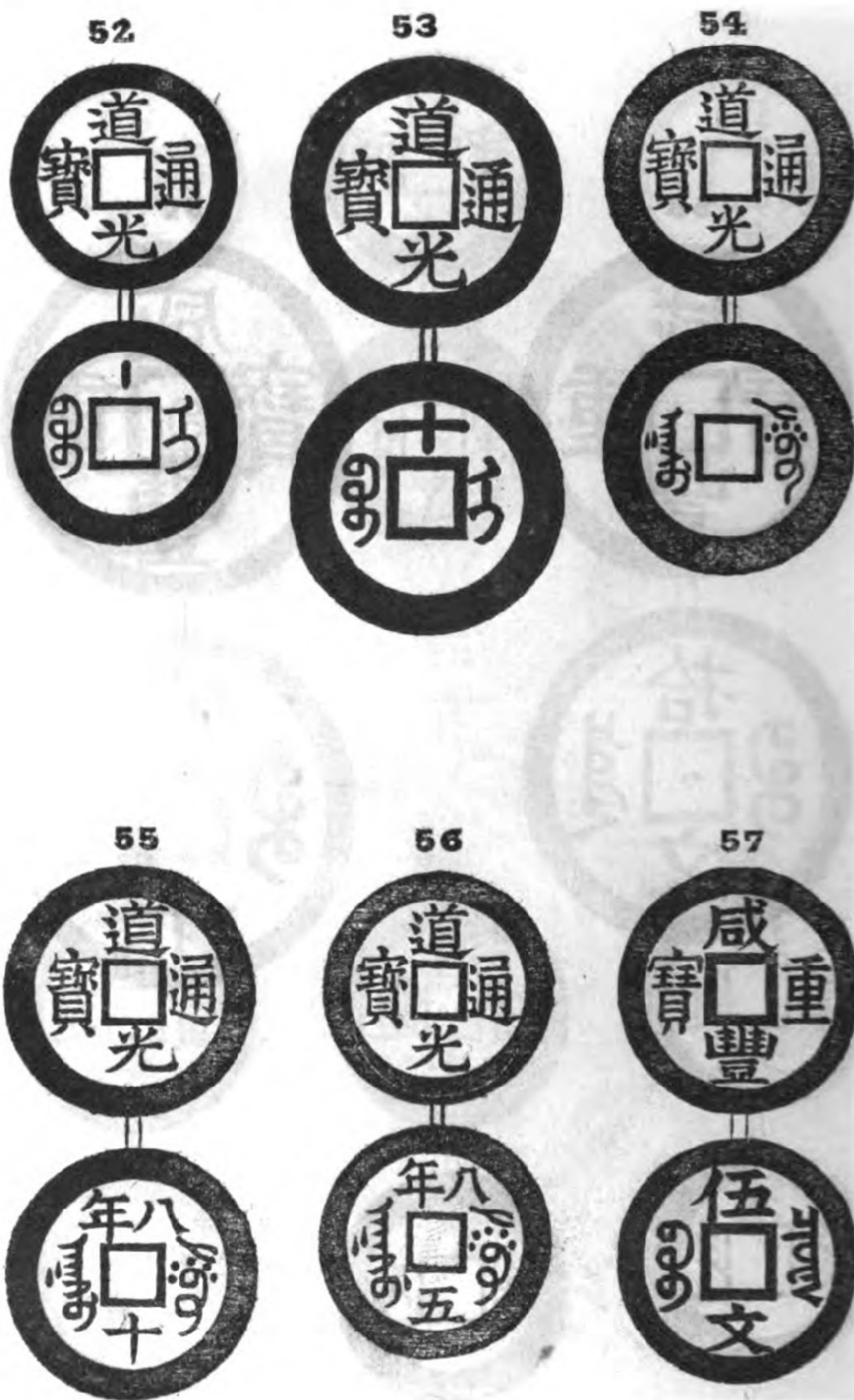


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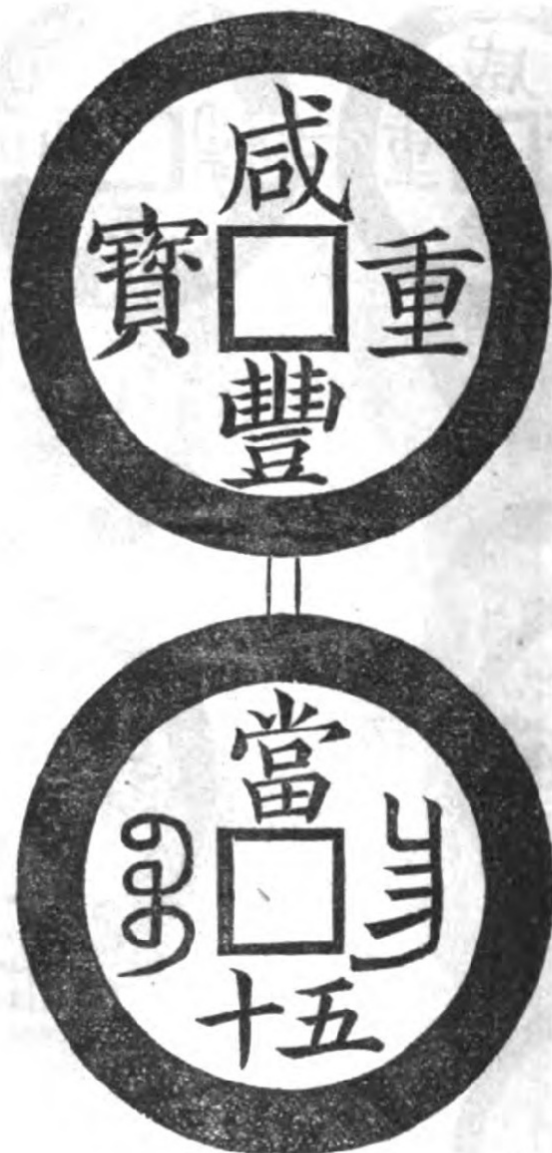
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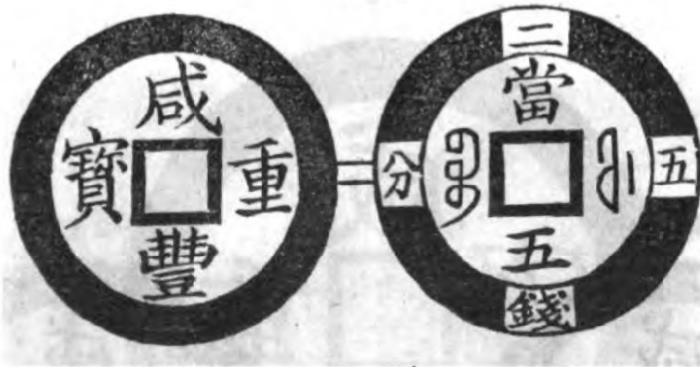


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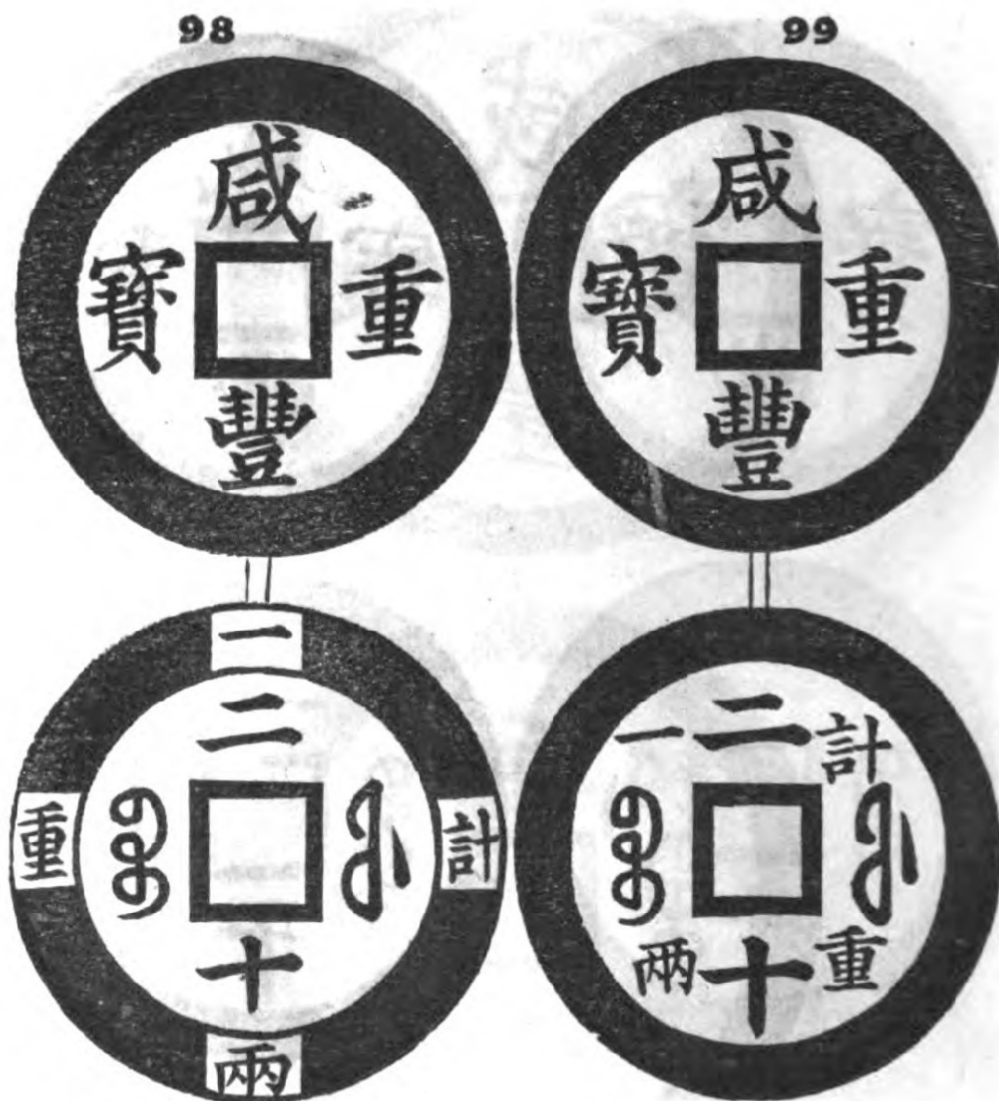


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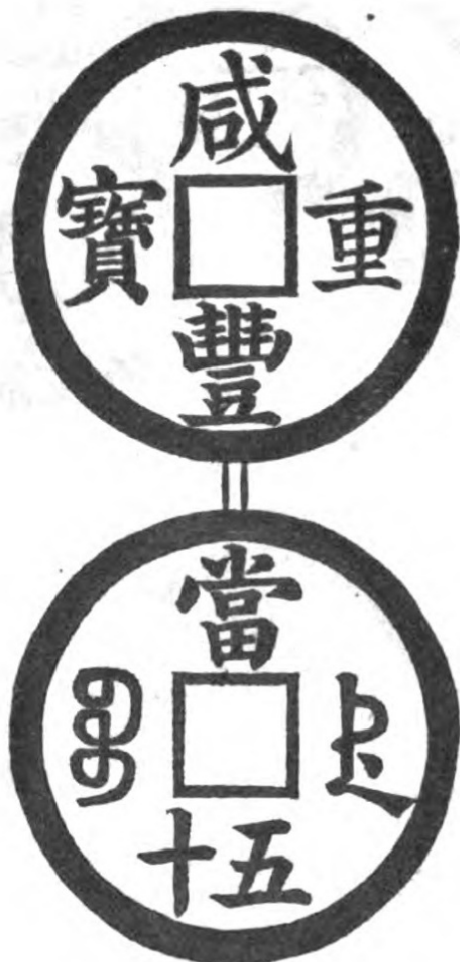
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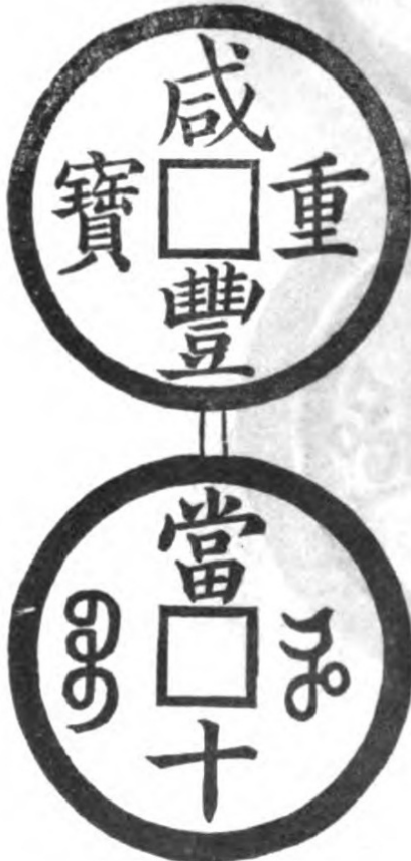
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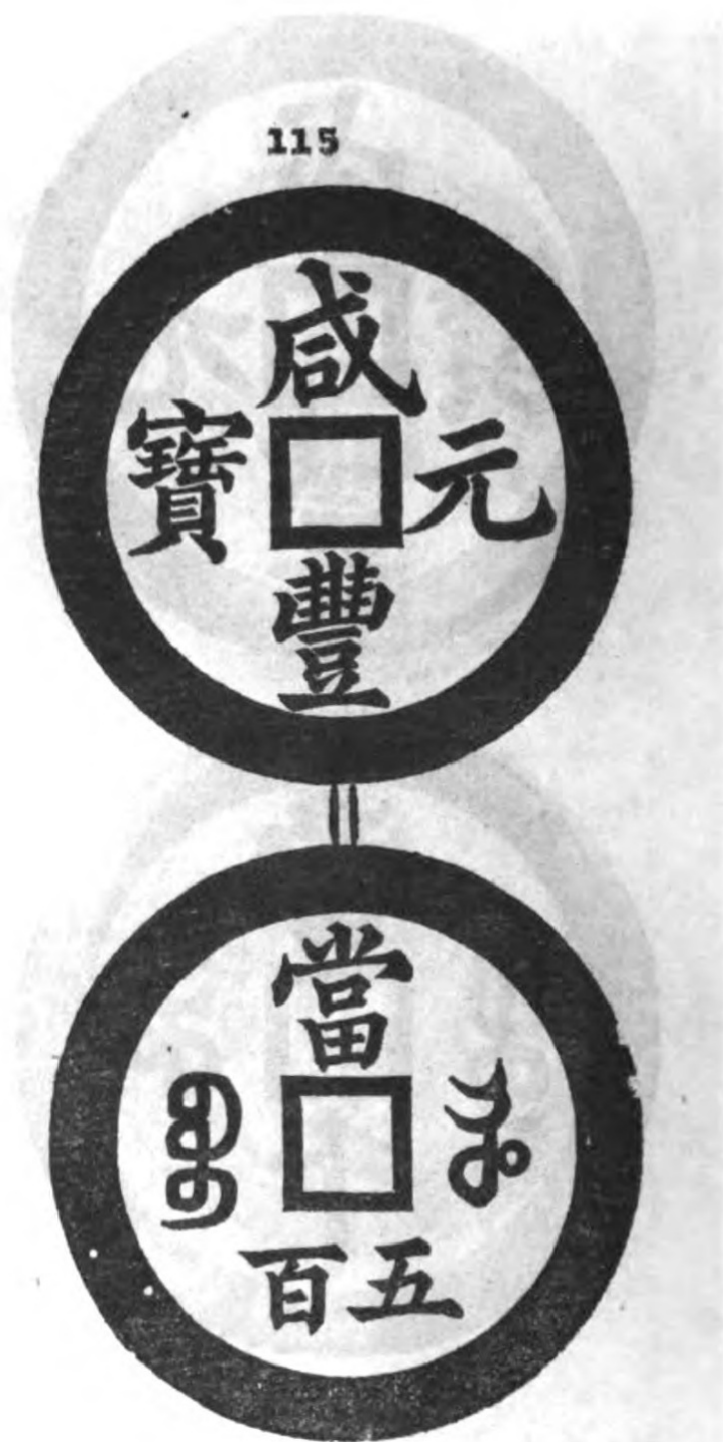


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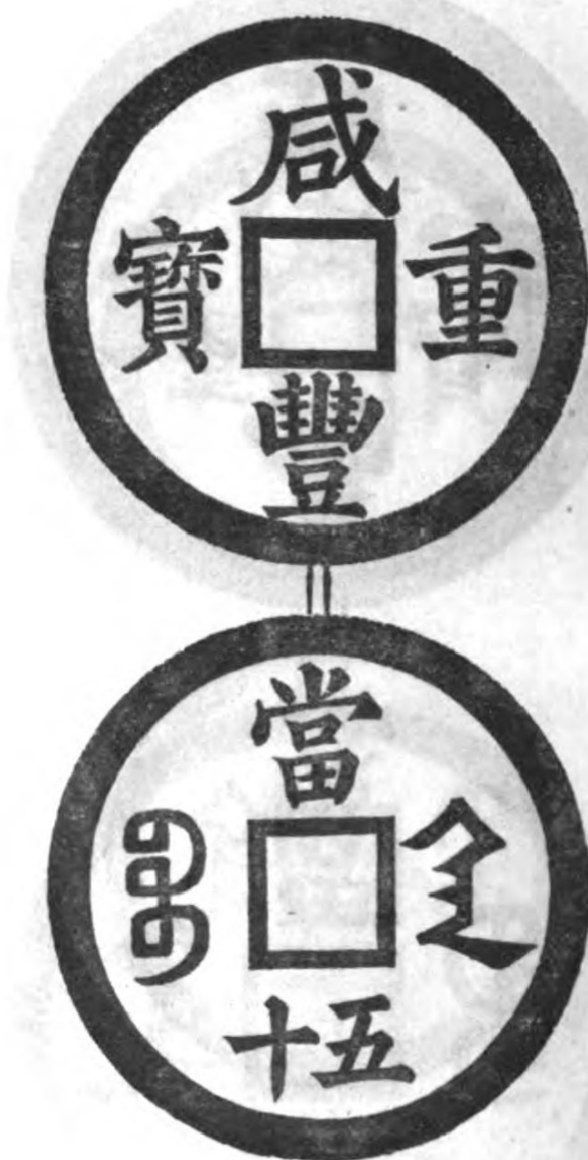
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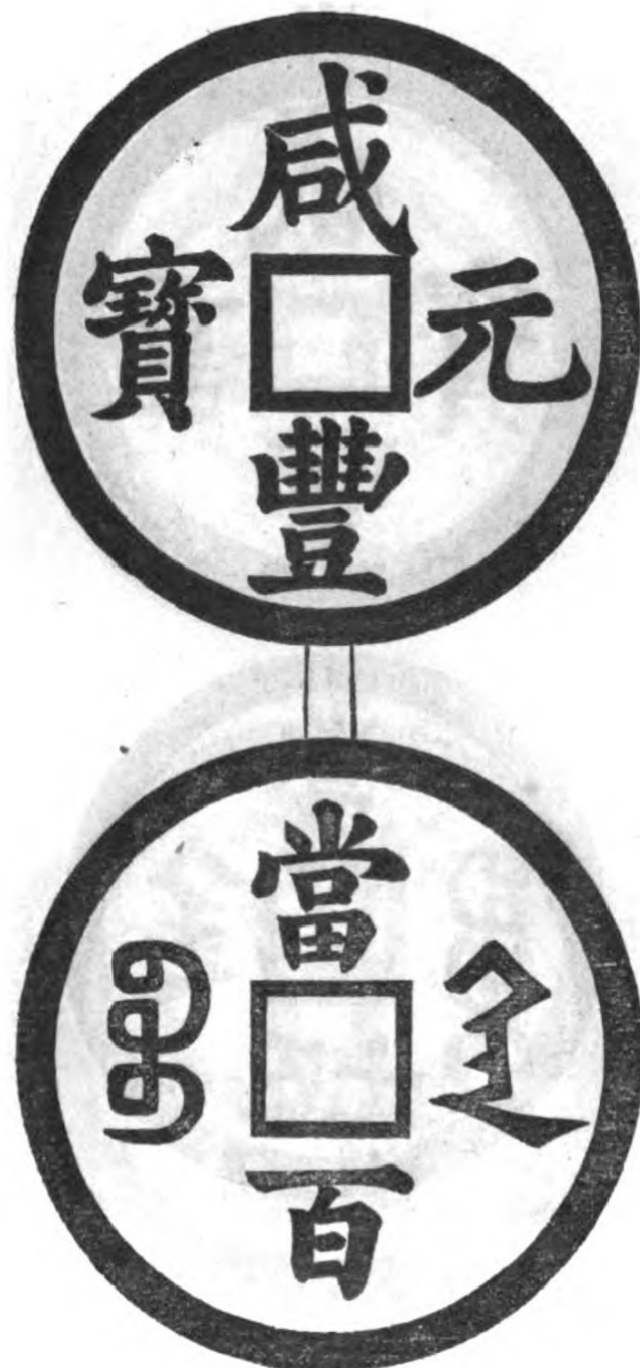
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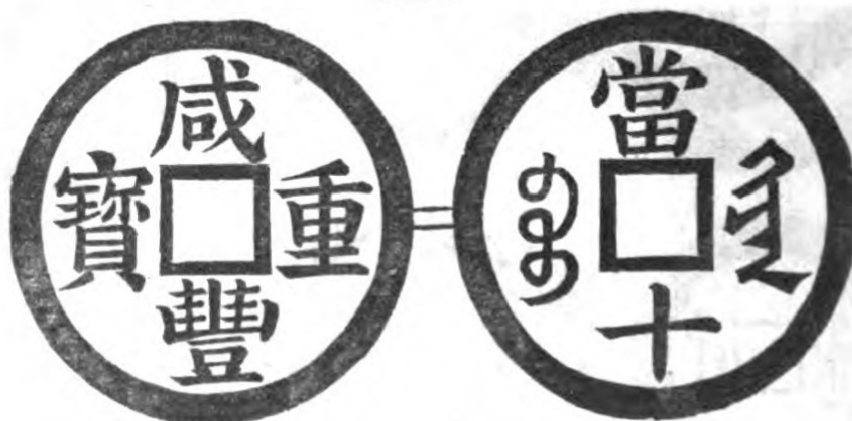
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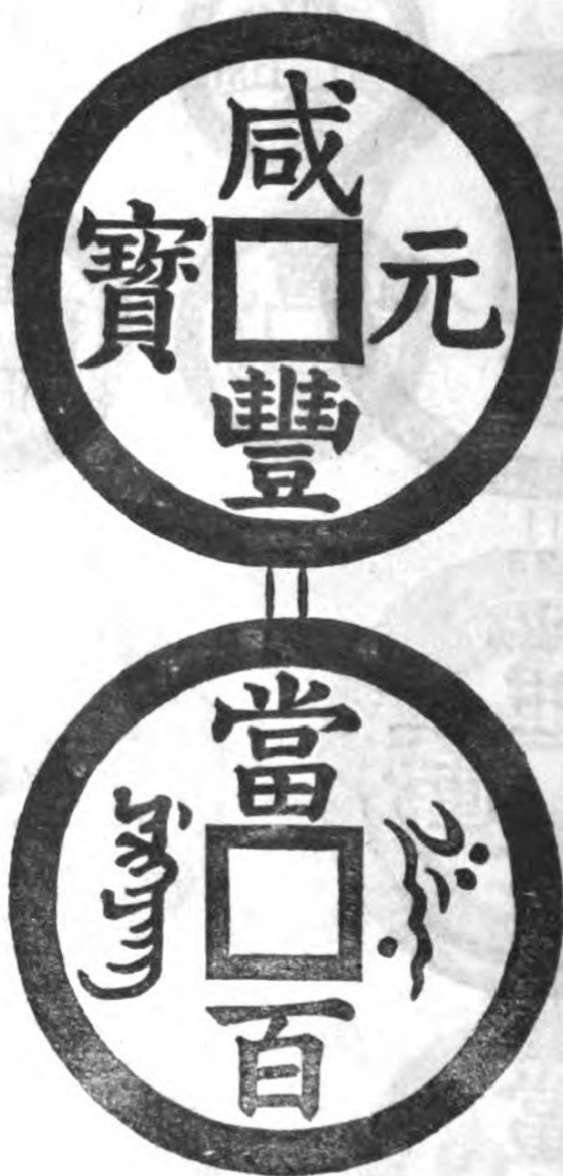


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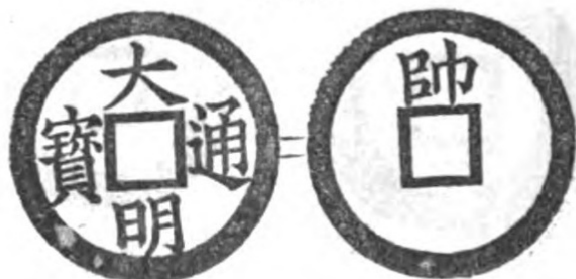
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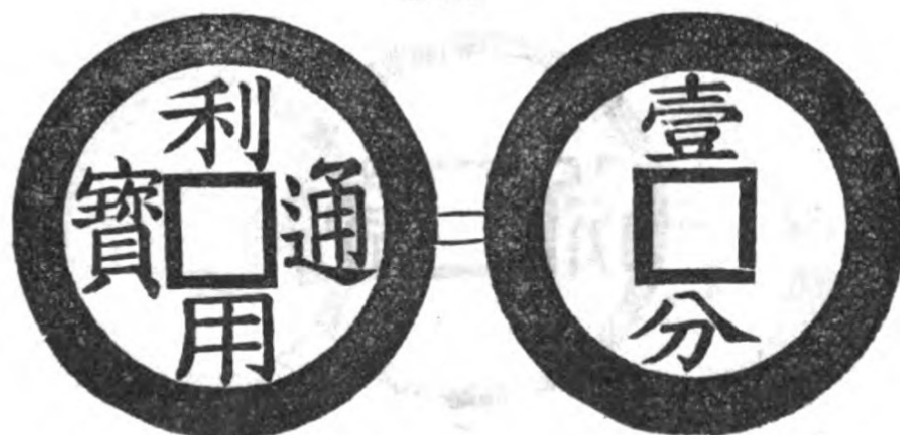
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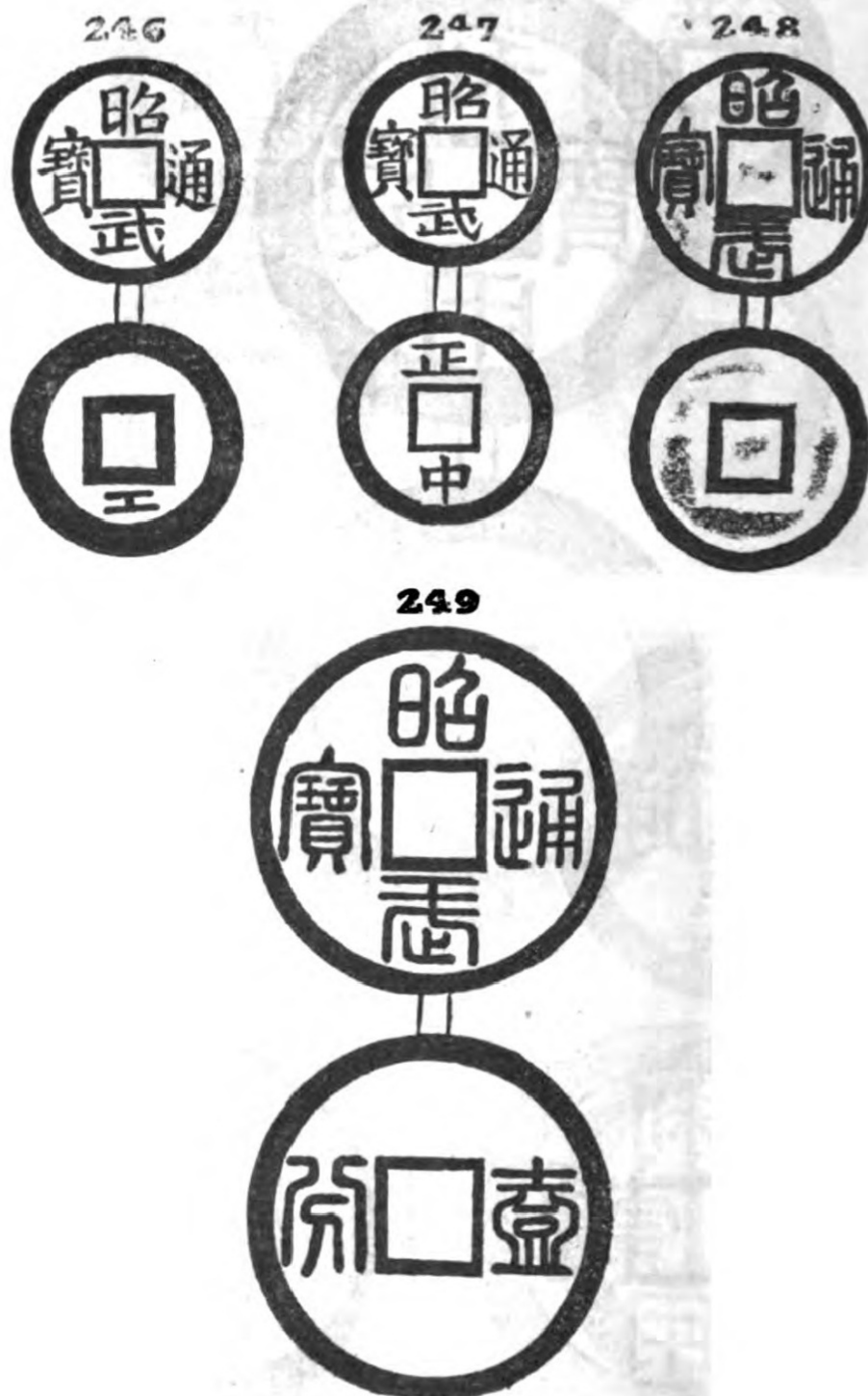


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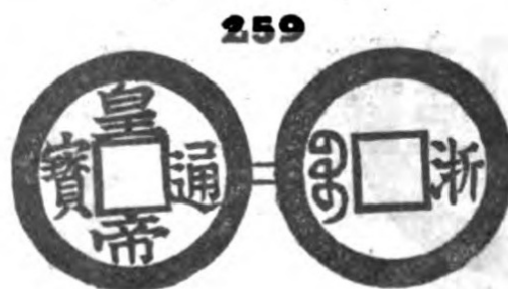
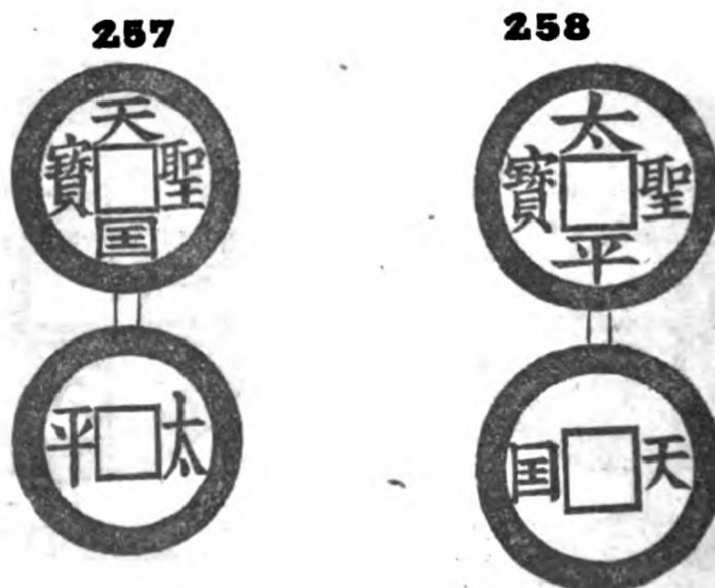
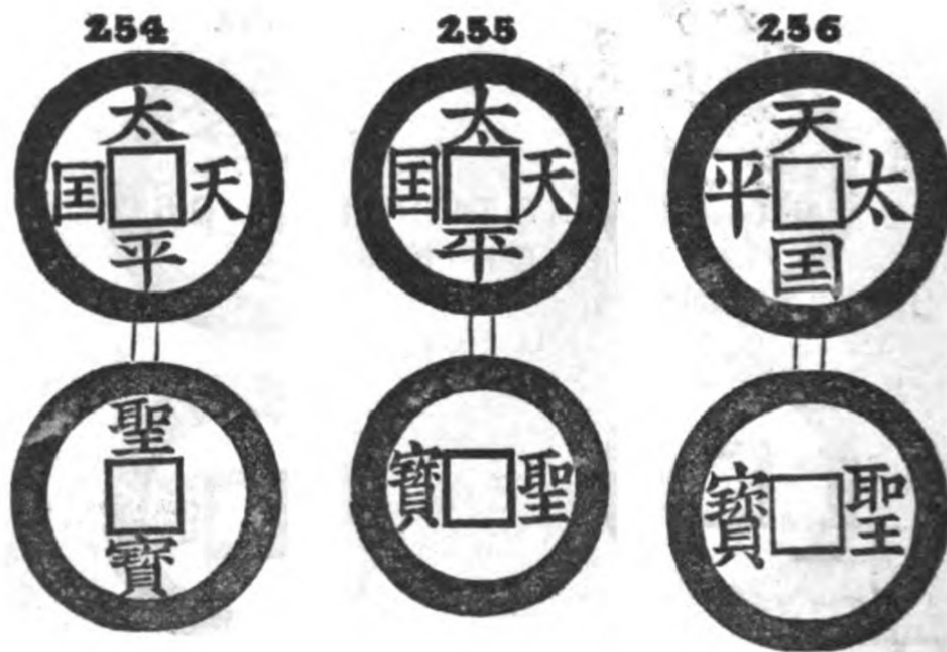
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### ARTICLE III.

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## THE "NATURALISTIC" PHILOSOPHY OF CHINA.\*

BY FREDERIC H. BALFOUR. F.R.G.S.

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**I**T occasionally happens that a sudden ray of clear and valuable light is thrown upon a long-disputed subject from a source the very existence of which was unsuspected, and the authority of which would certainly never have been allowed. Just as an accident may reveal what generations of scientific men have laboured in vain to discover: just as a rank outsider may win a race, or the dart, shot at a venture, hit the bull's-eye when trained archers have discharged a quiver-full of arrows without success,—so may some happy and spontaneous phrase, falling from one who approaches a topic of interest or difficulty for the first time, fresh and unencumbered by preconceptions or the dissertations of experts, embody in itself the kernel of the enigma, and make the whole thing promptly and for ever plain. And such a service has, I think, been lately rendered to the cause of philosophical research in China. An able American writer, whose recent work on "Oriental Religions" is, or ought to be, on the shelf of every reading man, gives to the Confucian school, for the first time, its true designation of Rationalist. Confucius was a Rationalist in every sense; his followers are Rationalists; his philosophy was altogether Rationalistic in its scope. The word is just the one we wanted, but which we never found; and its universal acceptance, from henceforth, can be only a matter of time. It is not only for supplying us with a just descriptive epithet for the orthodox philosophy of China, however, that we are indebted to Mr. Johnson. As soon as ever the term Rationalism is recognised as belonging to the system of Confucius, it will fall into deserved desuetude in that sphere where hitherto it has usurped another's right. No word could, in my opinion, be more inappropriate, or more unhappily selected, as applied

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\* Read before the Society on the 21st September, 1880.



to the philosophy of Lao Tsze. That the character *Tao* 道 may be properly translated "reason" in certain instances, I do not deny. That it is an apt equivalent for *λογος* in the Johannine sense of the word appears generally allowed. For the rendering of it by "way" there are both etymological and philosophical recommendations which may not be overlooked. But that none of these is the true and actual meaning of the word in its esoteric sense I hope to show in the present paper; submitting, at the outset, that no fitter illustration could be offered of the fatality attending servile adherence to a literal system of translation than the rendering, hitherto in force, of Reason. The letter killeth; and in the present instance it has killed all sense and meaning out of the word it was attempting to explain.

The position we take up, therefore, is a very simple one. To put it algebraically, *Tao* is the  $x$ , or unknown quantity that we have to find. And the first thing to be done is to see what is predicated of this mysterious Thing; how it is described; with what attributes it is credited; where it is to be found; whence it sprang, how it exists, and what its functions are. Then we may find ourselves in a position to discover what it is that answers to these particulars, and profanely to give a name to that which its preachers themselves declared must be for ever nameless.

We are told that it existed before the time which had no beginning had begun. Chuang Tsze says that there never was an epoch when it was not. Lao Tsze affirms that it existed before God Himself. It is all-pervasive; there is nowhere where it is not found. It fills the Universe with its grandeur and sublimity; yet it is so subtle that it exists in all its plenitude in the tip of an autumn hair. It causes the sun and moon to revolve in their appointed orbits, and gives life to the most microscopic insect. Formless, it is the source of every form we see; inaudible, it is the source of all the sounds we hear; invisible, it is that which lies behind every external object in the world; inactive, it produces, sustains, and regulates every phenomenon which exists in all the spheres of being. It is impersonal, passionless; working out its appointed ends with the remorselessness of Fate, yet overflowing in benevolence to all. "What is *Tao*?" exclaims Huai-nan Tsze. "It is that which supports Heaven and covers Earth; it has no boundaries, no limits; its height cannot be measured, nor its depth fathomed; it enfolds the Universe in its embrace, and confers visibility upon that which of itself is formless ....



It fills all within the Four Points of the Compass; it contains the Yin and Yang; it holds together the Universe and Ages, and supplies the Three Luminaries with light. It is so tenuous and subtle that it pervades everything just as water pervades mire. It is by *Tao* that mountains are high and abysses deep; that beasts walk and birds fly; that the sun and moon are bright, and the stars revolve in their courses. . . . When the spring-winds blow, the sweet rain falls, and all things live and grow. The feathered ones brood and hatch, the furry ones breed and bear; plants and trees put forth all their glorious exuberance of foliage, birds lay eggs, and animals produce their offspring; no action is visible outwardly, and yet the work is completed. . . . Shadowy and indistinct! it has no form. Indistinct and shadowy! its resources have no end. Hidden and obscure! it reinforces all things out of formlessness. Penetrating and permeating everything! it never acts in vain".

Such are a few of the attributes ascribed to the nameless principle we are considering. What ideas do they suggest to our mind?—Such, I believe, as cannot be expressed in a single word. Lao Tsze and his successors recognised the fact that for this mysterious entity there can be no name, so they spoke of it as *Tao*. We in the West have practically arrived at the same conclusion. What is it that makes flowers grow up and water flow down, which causes the showers to fall and the sun to shine, which guides the stars in their flaming courses, regulates the seasons, endows the butterfly with its radiant hues, gives one man red hair and another black, and, in a word, is the cause of every phenomenon we see, the main-spring of the huge machine of which we form a part? We, too, have failed to find a name for it, and so we call it *Nature*. This, I believe, is the key to early Taoism. Translate *Tao*, as used in this sense, by our common word *Nature*, and nine-tenths of the difficulties attending the study of this beautiful philosophy vanish of themselves. Nor is this true only of that phase of Taoism which deals with the physical universe. The instincts of animals and the workings of the vegetable creation are not any more the endowment of Nature than are the varying dispositions of mankind. The original constitution of every man, then, being the direct gift of Nature—or rather, an actual part of Nature itself—it follows that it should be jealously preserved intact, in all its pristine purity. This is the grand and primary object of Taoism—the preservation of one's Heaven-implemented nature. And how is this to be accomplished? By imitating the great Mother. Nature never

strives; therefore the Holy Man should guard himself from striving too. Nature is ever passive; therefore the Holy Man should let things take their course, contenting himself with following in their wake. Ambition, scheming, hatred, lust—any attention to external objects of whatever kind—are all so much disordering, or spoliation, of the original nature of man, and should therefore be utterly discarded. Even the active cultivation of virtues, such as benevolence, rectitude and propriety, is condemned; nature requires no action to stimulate her growth, and all the Holy Man has to do is bring himself into perfect conformity with her. All such passions, accomplishments, and attributes, being the result of striving, are called, in Taoist phrase, the *human* nature of man, in contradistinction to the *heavenly* or *natural* nature with which he is endowed. “Wherefore,” says Chuang Tsze, “do not develop this artificial, human, or engrafted nature; but *do* develop that heavenly nature which is your natural inheritance.” In Huainan Tsze’s “History of Great Light” we have a still more striking passage, in which the difference between the two natures is lucidly explained. Speaking of those happy ones who, by having arrived at a thorough understanding of the principle of Nature, have reverted to a state of pure repose, he says: “Nourishing their constitutions by tranquillity, and letting their spirits rest in indifference, they enter the Door of Heaven—*i.e.* Nature. And what is it that is called the Heavenly? It is that which is homogeneous, pure, simple, undefiled, ungarnished, upright, luminous and immaculate, and which has never undergone any mixture or adulteration from the beginning. And what is the Human? It is that which has been adulterated with shrewdness, crookedness, dexterity, hypocrisy, and deceit; wherefore it bends itself in compliance with the world, and is brought into association with the customs of the age. For example: the ox has horns and a divided hoof, while the horse has a dishevelled mane and a complete hoof; this is the Heavenly—or natural. Putting a bit into the horse’s mouth and piercing the nose of the ox; this is the Human—or artificial. Those who follow the Heavenly are such as roam in company with Nature; those who follow the Human are such as mix themselves up with the fashions of the world.... Wherefore”, continues the philosopher, “the Holy Man does not allow the Human to disorder the Heavenly—he suffers no injury to be done to his true nature; nor does he permit Desire to disturb his natural feelings. He acts exactly as he ought, without considering what

he shall do beforehand; he is trustworthy, without promising; he obtains all he wants without anxiety, and he brings all his designs to completion without doing anything himself. His "Spiritual Palace"—a Taoist euphemism for *mind*—"being replete with pure sincerity, he assists the Creator Himself in the government of men."

This leads me to the consideration of what may be termed the first development of the Naturalistic theory. In order to bring himself into conformity with Nature, it is imperative that the Holy Man should remain always and completely passive. This is expressed by the formula *wu wei*, which may be variously rendered "non-exertion", "not-doing", "inertia", "absolute inaction", or "masterly inactivity". In addition to the idea of undisturbed quiescence it embraces also that of spontaneity and designlessness; so that even the rigid adherence to an inactive policy is robbed of its full virtue if it be adopted with intent. The very effort to obtain possession of Nature, says Chuang Tszé, defeats itself, for the simple reason that it is an effort. A man must be passionless as well as motionless; he must be content to leave himself to the influences which surround him, and discard all thoughts of helping on the work; he must banish desire from his heart; he must concert no schemes and form no plans; he must never anticipate emergencies, but simply mould himself according to any circumstances that may arise. And especially is this of importance in the world of politics. Here the formula *wu wei* must be translated "non-interference"—that wise and far-sighted policy the world is so slow to learn. The Taoist condemns over-legislation, and justly points to the peddling meddling system of a so-called paternal government as the cause of anarchy and ruin. Never do anything, he says, for the mere sake of doing it; never do anything that is not absolutely necessary; leave the people to develop their own resources, and feel their own way to tranquillity and prosperity. Let Nature work unimpeded, in social and political life as well as in the sphere of physics or of morals; then your subjects will be contented with their lot, and your kingdom free from conspiracies, dissensions, and disaster. Do nothing to disturb their primitive simplicity. Do not seek to replace their rough instruments of labour by complicated machines; such refinements lead to luxury, to scheming, to ambition, and to discontent; the very exercise of such ingenuity implies a scheming mind; therefore, discourage artificial innovations. The secret of happiness is to be found in quiescence, simplicity, and

content ; and the only way to attain to these is to bring body, passions, intellect and will into absolute conformity with Nature.

The descent from these sublime and simple ethics during the Han and succeeding dynasties was fatally rapid. They soon became obscured in a mist of hocus-pocus and imposture, in which idolatry, the prolongation of life, the elixir of immortality and the transmutation of metals played a prominent part. With this degraded phase of Taoism we have nothing whatever to do. It is only sad to reflect how soon and how irrevocably the ancient doctrines of Lao Tsze and his successors fell into desuetude and have since endured the reproach of their enforced association with a system of superstitious folly. The fine indifference of the old Taoists to life and death, wealth and penury, has given way to sordid avarice and attempts to prolong the existence of the material frame ; the pure code of the Naturalistic philosopher has been reversed ; his precepts are forgotten, his dignity dishonoured. But the Canons of Taoism proper are still open to us, and they are deserving of careful study. The "orthodox" theories of the Rationalist school have surely had an ample share of attention from Western scholars, while the independent doctrines of the rival teachers have been in a measure neglected. And yet the Naturalists are far bolder and more original in thought than the Rationalists ; they are trammelled by no slavish reverence for departed kings and exploded platitudes ; their minds are free, their theories striking, and their practice pure. I will not write more upon this subject now, however, though in one sense it is almost inexhaustible. A forthcoming translation \* of Chuang Tsze's "Divine Classic of Nan-hua" will, I trust, do something, however little, towards attracting the attention of sinologues to the beautiful Philosophy of Nature preached by the founder of Taoism ; a study, I make bold to add, which cannot fail to yield rich stores of benefit to every one who takes it up, be he scholar, dilettanti, or divine.

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\* Since published.









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## CONTENTS.

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CONTENTS: I.—Inaugural Address, By Rev. E. C. Bridgman, D.D. II.—On Cyclones, or the Law of Storms, By Sir F. W. Nicolson, Bart. III.—Coins of the Ta-Ts'ing or Present Dynasty of China, By A. Wylie. IV.—Contribution to the Ethnology of Eastern Asia, By D. J. MacGowan, M.D. V.—A Buddhist Shastra, translated from the Chinese, By the Rev. J. Edkins, B.A. VI.—Visit to Simoda and Hakodadi, By Capt. A. H. Foote. VII.—Record of Occurrences in China.

*VOL. I., Part II.* (May, 1859), pp. 145 to 256. With 6 plates. Out of print.

CONTENTS: I.—Narrative of a Visit to the Island of Formosa, By Robert Swinhoe. II.—Notices of the Character and Writings of Meh Ts'i, By the Rev. Joseph Edkins, B.A. III.—Chinese Bibliography, By D. J. MacGowan, M.D. IV.—On the Musical Notation of the Chinese, By the Rev. E. W. Syle, A.M. V.—Lecture on Japan, By S. W. Williams, L.L.D. VI.—On the Study of the Natural Sciences in Japan, By Thr. J. L. C. Pompe van Meerdervoort, M.D. VII.—On the present state of some of the Magnetic Elements in China, and places adjacent, By Capt. C. F. A. Shadwell, C.B. VIII.—Notes on some new species of birds found on the Island of Formosa, By R. Swinhoe. IX.—Sailing Directions for the Yang-Tsze Kiang, from Woosung to Hankow, By Capt. John Ward, R.N. X.—Thermometrical Observations, taken during a Passage from Nagasaki to Shanghai, By Capt. J. Fedorovitch. XI.—Record of Occurrences in China.

*VOL. I., Part III. (December, 1859), pp. 257 to 368.*

CONTENTS: I.—Sketches of the Miau-Tsze, By Rev. E. C. Bridgman, D.D. II.—The small Chinese Lark, By Robert Swinhoe. III.—On the Banishment of Criminals in China, By D. J. MacGowan, M.D. IV.—Cotton in China, By D. B. Robertson. V.—A Sketch of the Taulist Mythology in its modern Form, By the Rev. Joseph Edkins. VI.—Narrative of the American Embassy to Peking, By S. Wells Williams, L.L.D. VII.—Meteorological Tables, from Observations made in Japan. VIII.—Record of Occurrences.

*VOL. II., Part I. (September, 1860.) (Only Part I, published), pp. 128.*

CONTENTS: I.—A Sketch of the Life of Confucius, By the Rev. Joseph Edkins. II.—The Ethics of the Chinese, By the Rev. Griffith John. III.—On the Cosmical Phenomena observed in the Neighborhood of Shanghai, during the past thirteen Centuries, By D. J. MacGowan, M.D. IV.—On the Ancient Mouths of the Yang-tsï Kiang, By the Rev. J. Edkins. V.—Dissection of a Japanese Criminal, By Dr. J. L. C. Pompe van Meerdervoort. VI.—Notes on the Mineral Resources of Japan, etc., By Wm. H. Shook. VII.—Supplemental Memorandum on the present state of the Magnetic Elements in China and places adjacent, By Capt. Shadwell, R. N., C.B. VIII.—Temperature of Hakodadi. Communicated by Charles F. A. Courtney. IX.—Winds and Weather at Chefoo, during seven months of the year 1859. X.—Record of Occurrences.

*NEW SERIES.—Vol. I. (1864), pp. IX, 129 to 174 and 148. With Map.*

CONTENTS: I.—Notes on the City of Yedo, By Rudolph Lindau. II.—Notes on some of the Physical Causes which modify Climate, By James Henderson, M.D. III.—Narrative of an Overland Trip, through Hunan, from Canton to Hankow. By Dr. W. Dickson. IV.—The Overland Journey from St. Petersburg to Peking, By A. Wylie. V.—The Medicine and Medical Practice of the Chinese, By James Henderson, M.D. VI.—The Sea-Board of Russian Manchuria, By J. M. Canny. VII.—Retrospect of Events in the North of China, during the years 1861 to 1864, By R. A. Jamieson. Miscellaneous: Remarks on some impressions from a Lapidary Inscription at Keu-Yung-Kwan, on the great wall near Peking, By A. Wylie. Etc., etc.

*VOL. II., (1865), pp. XVI and 187. With 4 Maps and Illustrations.*

CONTENTS: I.—Notes on the Geology of the Great Plain, By Dr. Lamprey. II.—A Sketch of the Geology of a Portion of Quang-Tung Province, By Thos. W. Kingsmill. III.—Neau-Show, Birds and Beasts (of Formosa.) Translated by Robert Swinhoe. IV.—Sei Yo Ki-Bun, or Annals of the Western Ocean, Translated by the Rev. S. R. Brown. Parts I and II. V.—Sorgo, or Northern Chinese Sugar



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*VOL. III. (1866), pp. XII and 121. With 2 Maps and Illustrations.*

CONTENTS: I.—Notes of a Journey from Peking to Chefoo, via Grand Canal, Yen-Chow-Foo, etc., By Rev. A. Williamson. II.—Account of an Overland Journey from Peking to Shanghai, made in February and March 1866, By Rev. W. A. P. Martin, D.D. III.—Sei-Yoō Ki-Bun, (Annals of the Western Ocean.) Part III, By Rev. S. R. Brown. IV.—Description of the Great Examination Hall at Canton, By J. G. Keer, A.M., M.D. IVa.—Notes on the Opinions of the Chinese with regard to Eclipses, By A. Wylie. V.—On some Wild Silkworms of China, By D. B. McCartee, A.M., M.D. VI.—Political Intercourse between China and Lewchew, By S. Wells Williams, L.L.D. VII.—Notes on some outlying Coal-fields in the South-Eastern Provinces of China, By Thos. W. Kingsmill. VIII.—A short sketch of the Chinese Game of Chess, called Kh'e, By H. G. Hollingworth. IX.—Retrospect of Events in the North of China during the year 1866, Compiled by Chas. H. Butcher, M.A.

*VOL. IV. (1867), pp. XI and 266. With Map and Diagrams.*

CONTENTS: I.—Sketch of a Journey from Canton to Hankow through the Provinces of Kwangtung, Kwangsi, and Hunan, with Geological Notes, By Albert S. Bickmore, A.M. II.—Translation of Inscription on Tablet at Hangchow, recording the changing the T'ien Chu Tang (Roman Catholic Church) into the T'ien Hao Kung, By Christopher T. Gardner. III.—Notes on the North of China, By Rev. A. Williamson. IV.—Notes on the Productions, chiefly Mineral of Shantung, By the Rev. A. Williamson. V.—Entomology of Shanghai, By W. B. Pryer. VI.—Notes on a Portion of the Old Bed of the Yellow River and the Water supply of the Grand Canal, By Ney Elias. VII.—Eclipses recorded in Chinese Works, By A. Wylie. VIII.—Chinese Chronological Tables, By Wm. Frederick Mayers. IX.—The Christianity of Hung Tsiu Tsuen, A Review of Taeping Books, By Robert James Forrest. X.—Carte Agricole Générale de l'Empire Chinois. Texte Préface, Légende et Répertoire, Par G. Eug. Simon. XI.—Chinese Notions about Pigeons and Doves, By T. Watters. XII.—The Bituminous Coal Mines West of Peking, By Rev. Joseph Edkins. XIII.—Retrospect of Events in China and Japan during the year 1867, By Thos. W. Kingsmill.

*VOL. V. (1868), pp. XVII, and 285. Out of Print.*

CONTENTS: I.—Note sur les Petites Sociétés d'Argent en Chine, Par G. Eug. Simon. II.—Notes on the Coal-fields and General Geology of the Neighbourhood of Nagasaki, By Thos. W. Kingsmill. III.—Notions of the Ancient Chinese respecting Music, By Dr. B. Jenkins. IV.—Recent Elevations in China and Japan. By Albert S. Bickmore. V.—Notices of Lok Ping Cheung, late Governor General of Szechuen, By Rev. C. F. Preston. VI.—The Tablet of Yü, By W. H. Medhurst. VII.—Note sur quelques unes des recherches que l'on pourrait faire en Chine et au Japon au point de vue de la Géologie et de la Paléontologie, Par G. Eug. Simon. VIII.—Itinerary of a Journey through the Provinces of Hoo-Pih, Sze-Chuen and Shen-Se, By A. Wylie. IX.—Report of an Exploration of the New Course of the Yellow River. By N. Elias, Jr. X.—Retrospect of Events in China and Japan during the year 1868.

*VOL. VI. (1869-70,) pp. XV. and 200. With Illustrations.*

CONTENTS: I.—Notes on the Shantung Province, being a Journey from Chefoo to Tsiuhsien, the City of Mencius, By John Markham. II.—On Wên-Ch'ang, the God of Literature, his History and Worship, By Wm. Frederick Mayers. III.—The Fabulous Source of the Hoang-Ho, By E. J. Eitel. IV.—Sur les Institutions de Crédit en Chine. Par G. Eug. Simon. V.—On the Introduction and use of Gunpowder and Firearms among the Chinese, By W. F. Mayers. VI.—The Chinese Game of Chess as compared with that practised by Western Nations, By K. Himly. VII.—Note on the Chihkiang Miao-tsz', By D. J. Macgowan, M.D. VIII.—Notes on the Provincial Examination of Chekeang of 1870, By Rev. G. E. Moule. IX.—Chinese Chemical Manufactures, By F. Porter Smith, M.B. X.—Journal of a Mission to Lewchew in 1801, By S. Wells Williams, L.L.D. XI.—Translation of the Inscription upon a Stone Tablet commemorating the Repairs upon the Ch'eng Hwang Miao or Temple of the Tutelary Deity of the City, By D. B. McCartee, A.M., M.D. XII.—Retrospect of Events in China and Japan during the years 1869-70, By J. M. Canny.

*VOL. VII. (1871-72,) pp. IX. and 260.*

CONTENTS: I.—A Historical and Statistical Sketch of the Island of Hainan, By Wm. Frederick Mayers. II.—The Aborigines of Hainan, By Robert Swinhoe. III.—Narrative of an Exploring Visit to Hainan, By Robert Swinhoe. IV.—Chinese Lyrics, By G. C. Stent. V.—The Mythical Origin of the Chow Dynasty, By Thos. W. Kingsmill. VI.—The Obligations of China to Europe in the matter of Physical Science, acknowledged by eminent Chinese, By Rev. G. E. Moule. VII.—The Life and Works of Han Yü or Han Wên Kung, By T. Watters. VIII.—Chinese Legends, By G. C. Stent. IX.—The Antiquities of Cambodia, By J. Thompson. X.—Quelques Renseignements sur l'Histoire Naturelle de la Chine Septentrionale et Occidentale, Par le R. Père Armand David. XI.—Chinese use of Shad in consumption and Jodine Plants in Scrofula, By D. J. Macgowan, M.D. XII.—On the "Mutton Wine" of the Mongols and analogous preparations of the Chinese, By Dr. MacGowan. XIII.—Retrospect of Events in China, &c., during the years 1871 and 1872.

*VOL. VIII., (1873,) pp. XII. and 187. With 25 Plates.*

CONTENTS: I.—Recollections of China prior to 1840, By S. W. Williams L.L.D. II.—The Legend of Wên Wang, Founder of the Dynasty of the Chows, By Thos. W. Kingsmill. III.—Extracts from the History of Shanghai, By C. Schmidt. IV.—Chinese Fox-myths, By T. Watters. V.—Brief Account of the French Expedition of 1866 into Indo-China, By S. A. Viguiier. VI.—A Visit to the City of Confucius, By the Rev. J. Edkins, B. A. VII.—Chinese Instruments of Music, By N. B. Dennys. VIII.—The Stone Drums of the Chou Dynasty, By S. W. Bushell, M.D. IX.—Retrospect of Events in China for the year 1873.

*VOL. IX., (1874,) pp. XXXIII. and 219. With Illustrations.*

CONTENTS: I.—Notes on Col. Yule's Edition of Marco Polo's "Quinsay," By the Rev. G. E. Moule. II.—Legends of the Ancient Mazdayasniian Prophets, By D. N. Camajee. III.—The Aborigines of Northern Formosa, By E. C. Taintor, A.M. IV.—Notes on the Miao-Fa-Lien-Hua-Ching, a Buddhist Sûtra in Chinese, By T. Watters. V.—Narrative of Recent Events in Tong-King, By Henri Cordier. VI.—Notes on Chinese Toxicology, By D. J. Macgowan, M.D. VII.—Retrospect of Events in China and Japan for the year 1874, By Rev. J. Thomas. VIII.—A Classified Index to the Articles printed in the Journal of the North-China Branch of the Royal Asiatic Society.

*VOL. X. (1875,) pp., XII. 324, and 259. With Maps.*

CONTENTS: I.—Elucidations of Marco Polo's Travels in North-China, By the Rev. Archimandrite Palladius. II.—Notes made on a Tour through Shan-Hsi and Shen-Hsi, By Rev. C. Holcombe. III.—Short Notes on the Identification of the Yuè-Ti and Kiang Tribes of Ancient Chinese History, By T. W. Kingsmill. IV.—Notices of the Mediæval Geography and History of Central and Western Asia, By E. Bretschneider, M.D. V.—Retrospect of Events in China, for the year 1875, By A. J. Little. Appendix: I.—List of the Principal Tea Districts in China. II.—Bulletins Météorologiques et Magnétiques de l'Observatoire de Zi-Ka-Wei, September à Décembre, 1874 et 1875.

*VOL. XI. (1876,) pp. XVI. and 184.*

CONTENTS: I.—Fort Zelandia, and the Dutch Occupation of Formosa, By H. E. Hobson. II.—The Vertebrata of the Province of Chihli with notes on Chinese Zoological Nomenclature, By O. F. von Möllendorff, Ph. D. III.—On the Style of Chinese Epistolary Composition, By the Rev. W. A. P. Martin, D.D. IV.—On Chinese Names for Boats and Boat Gear, with remarks on the Chinese use of the Mariner's Compass, By J. Edkins, D.D. V.—Chinese Eunuchs, By G. C. Stent.

*VOL. XII. (1877,) pp. 337. With 18 Maps.*

CONTENTS: I.—On the Stone Figures at Chinese Tombs and the Offering of living Sacrifices, By W. F. Meyers. II.—The Comparative Study of Chinese Dialects, By E. H. Parker. III.—Droughts in China, A.D. 620 to 1643, By Alex. Hosie, M.A. IV.—Sunspots and Sun-Shadows observed in China, B.C. 28,—A.D. 1617, By Alex. Hosie, M.A. V.—The Ancient Language and Cult of the Chows, By Thos. W. Kingsmill. VI.—The Climate of Eastern Asia, By Dr. H. Fritsche.

*VOL. XIII. (1878,) pp. XXXI. and 132. With Plates and Illustrations.*

CONTENTS: I.—Alligators in China, By A. A. Fauvel. II.—Periodical Change of Terrestrial Magnetism, By F. W. Schulze. III.—The Family Law of the Chinese, and its Comparative Relations with that of other Nations, By P. G. von Möllendorff. IV.—The Story of the Emperor Shun, By Thos. W. Kingsmill.

*VOL. XIV. (1879,) pp. XV. and 64. With Illustrations.*

CONTENTS: I.—The Intercourse of China with Central and Western Asia in the 2nd Century B.C, By T. W. Kingsmill. II.—Rock Inscriptions at the North Side of Yentai Hill, By J. Rhein. III.—Siamese Coinage, By Jos. Haas.

*VOL. XV. (1880,) pp. and 316.*

CONTENTS: I.—Early European Researches into the Flora of China, By E. Bretschneider, M.D. II.—Coins of the present dynasty of China, By S. W. Bushell, M.D. III.—On the Naturalistic Philosophy of China, By Frederic H. Balfour.

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